Museum Learning in the Digital Age

A Case Study of Digital Storytelling Production Practices in a Museum in Norway

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Abstract

The objective for this thesis was to study how the implementation of digital media and tablet computer technology on a school visit to the museum changes the premises of being a visitor to the museum. Traditionally, museum learning focus on knowledge transfer, and attempting to find its role in the contemporary society, museums open their archives with the wish for a more user-oriented museum. Related to the ongoing transformation in museum pedagogic Norwegian Museum of Science, Technology and Medicine and Norwegian Museum of Telecommunication joined forces to test out the genre of digital storytelling as a part of the museum programs offered to visiting schools. This initiative emerges out of societal expectations and the museum institutions interests in developing platforms for communication and models for cooperation with schools. The project was funded by the Cultural Council of Norway and has been developed in cooperation with the University of Oslo and Intermedia. Under the slogan *Fast Forward Digital Stories* these institutions wanted to assess whether it is possible to employ and offer the genre digital storytelling as part of a learning activity during a one day museum visit in the museum environment.

Theoretical framework

Resent debates regarding participation and democratic initiatives in education and museum learning and adolescents life has drawn the attention to the concept of agency and individual and collective capacities to make a difference. My analysis is framed in the concept of agency to look at how digital media and digital storytelling production as part of the learning activities during a museum visit foster the development of student agency. Agency is a capacity situated in the different contexts humans work and thrive in, and young people's lives is connected to multiple practices and so research on all of these contexts are relevant. This study is positioned in a socio-cultural perspective on learning with a holistic view on learning. Learning in the museum is being referred to as free-choice learning instead of informal learning, to illustrate what it is as opposed to what it is not (formal learning) (Falk & Dierking, 2000). Museum visits with no-choice or only free-choice has shown less prosperous learning outcomes than a limited choice visit to a museum (Bamberger & Tal, 2007), and I also frame my analysis within this research. The overall research question which guided the

analysis of the empirical data was: *In what ways does the student's use of tablet computer technologies support their agentive learning in the museum?*

Method

This thesis is based on a qualitative case study by conducting semi-structured video observations and interaction analysis. The museum invited a numerous of random schools in Norway to participate and three pilot tests were executed in the spring of 2012. I analysed two of these pilot tests after having video recorded two groups of eight grade students participating in the Fast Forward pilot. I analyzed the observation videos within the framework of interactional analysis, the concept of agency and the concept of free-choice learning, and in addition the idea of a limited-choice museum visit.

Results and conclusions

A visit to the museum features the properties of the concepts of free-choice learning, however exhibition design and museums educator instructions is of great importance to what extent the visitor pursue their agentive possibilities. My analysis of the data material indicates new visitor and museum educator roles, and the implementation of digital media and tablet computer technology in the learning activities changes the condition for being a visitor to the museum.

Digital media and tablet computer technology is a relatively new intervention in the educational context of museum learning and I argue therefore that every interactional dimension in the Fast Forward pilot is of equal interest. However, some of the main findings is related to how the tablet computer technology and the production of digital storytelling encourage collaboration, and further how the Fast Forward pilot and the museum educators supported the students as agentive learners. The production of digital stories with the use of tablet computers as a camera and as an editing tool provided the students with possibilities to represent the museum objects and archive in the frame of their own everyday and personal lives. The students use of tablet computers raise questions of digital technologies which include functions of re-presentation consequently may include new forms of reflections on museum objects, that go beyond earlier observational learning and that needs to be studied

along new paths and perspectives (Stuedahl & Kise, 2013). When the museum present photography and digital media productions as a learning activity the principle of being a visitor to the museum is altered, and possibilities for expanding students multiliteracies. In interactions with each other, with the archive material, the museum artefacts and the museum educators the students collected information, and combined this information with their personal experiences and prior knowledge in their production practice. This shift in the authoritarian voice of the museum is perhaps a move towards a more democratic museum (Hein, 2012), and as such possibilities for a more democratic education.

Forord

Jeg vil benytte denne anledningen til å takke alle de som har hjulpet meg med å gjennomføre arbeidet med denne oppgaven. Takk til min veileder Dagny Stuedahl for tålmodighet, forståelse og opplysende diskusjoner, og for et stort og ukjent antall timer i arbeidet med min oppgave. Takk til alle de involverte i og rundt forskningsseminarene i TransAction. I tilegg vil jeg takke studentene ved Intermedia, Ingvill Thommasen, Kaja Vembe Swensen, Sjur Seibt og Morten Kjelling, og takk til de ansatte ved pedagogisk forskningsinstitutt. Gjennom samtaler og diskusjoner har menneskene og det inkluderende miljøet på Intermedia bidratt med støtte og til min faglige utvikling. Takk til dere alle sammen. Takk til folkene på Norsk Teknisk Museum og til elevene som deltok i prosjektet. En spesiell takk til Silje, familie og venner som alle har funnet seg i mitt fysiske og mentale fravær i denne perioden.

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Innholdsfortegnelse

1 Introduction

The objective for this master thesis is to explore the implementation of digital media in museum learning. In compliance with the ongoing changes in Information and Communication Technology (ICT) the museums of today are also in a continuing transformation. This has an extensive influence on the understanding of learning in the museum and the relationship and platform of communication between the museum and the school, and the society in total. In their search for a contributing part in today's knowledge society the development of models of cooperation with the school are highly prioritized in the field of museum learning. In this thesis I draw the attention to challenges and possibilities by the introduction of digital media and explore what part media technology play in museum learning. In the museums and science centers this can be explored while establishing a foundation for insight into youth as learners, and users of media and technology.

1.1 Presentation of the Topic

Digital media is for long integrated into the society. Within the science of education however, it is not yet fully integrated in the theories of learning and education. ICT is in constantly change and development, and development in technology change human actions (Wertsch, 1998), and hence a need for continually researching this in relation to the field of learning and education.

The transformation of today's museum has an impact on the understanding of learning and the relationship between museums and schools. Traditionally, learning in the museum focus on knowledge transfer, and in an attempt to find its role in today's knowledge society, museums desire to open its archives to the public with a wish for a more user-oriented museum. The users of a digital museum has the opportunity to add their own knowledge to the stories that are associated with cultural objects, and in this way museums recognize that they are not the beholder of an exclusive right to this knowledge and that the public has their own right to contribute to the cultural history.

Digital media has recently marked its arrival in both the work of the museum collections and the dissemination of these, and it is the technology developments which enables these changes in museum communication. Therefore an expanding number of projects in the museums explore the potential digital media and information and communication technology has for facilitating communication with the visitor and learning in the museum. This is also reflected in governmental cultural political interest in Scandinavia on founding research regarding learning in museum and science centres. In a science centre program (VITEN) which started up in Norway in 2003, the objective was to become a service to schools and the general public, where the combination of science centre pedagogic and ICT in museum dissemination is seen as means to contribute to improve the quality both in science centres and museums (White paper.nr. 49, section. 4.3.5, Ministry of Culture, 2009). In this regard the focus is on new and better ways for the visitors to interact with the exhibitions which in turn open up for expanding possibilities in their meaning-making processes. In this context digital media has made its remark in museum research in connection to user involvement, co-production and learning (Dysthe, Bernhardt, Esbjørn, & Strømsnes, 2012) which furthermore implies recognitions that today's youth no longer are just consumers of knowledge and information but also producers of it. Therefore it is highlighted a need for framing this technology into existing theories of education (Stuedahl & Smordal, 2011a). In this regards the museum can be an appropriate venue to explore the role of new digital media technology in an out-of-school contexts of learning.

1.2 Aims and objectives

When the conditions for learning in the museum change, a radically new insight in this relation is required. Digital media technology is a relative new invention and therefore something that adolescents are familiar with, hence, the assumption that the implementation of digital media in the context of the museum, totally alters the educational premise where the museum can learn from children and teenagers (Dysthe et al., 2012). Therefore, this thesis seeks to contribute to the understanding of digital media in relation to museum learning and the museum as a cultural mediator in the contemporary. Furthermore, I frame this discussion in the socio-cultural view on educational research, and look at digital storytelling in relation to learning.

The challenge is that the ideas on motivation, learning and identity, to often are based on research in one socio-cultural context drawn from formal education (Paris, 2002, Dierking, 2000, Hein, 1998). Wertsch (2002) argues that performance efforts and avoidance of failure is the starting point of the modern theories of motivation, because they have their roots from research in schools. Further he argues that these theories not necessarily can be maintained and be generalized to the use in informal learning. The point is that the empirical data from a specific socio-cultural setting, namely formal education, has provided room for statements that do not necessarily need to be relevant in other learning contexts. Wertsch (2002) argue that the current discussion in museum education field does not recognize the fundamental difference between these two learning venues. In relation to the digital age, Wertsch (2002) discusses a shift in power and authority from the manufacturer of the objects and text to their consumers. As argued earlier in this chapter, in the digital age users will be transformed to be producers and not just consumers. In contrast to formal education, is learning in the museum voluntary and visitors spend relatively little time to interact with an exhibition (Hein, 1998). Even the most dedicated visitor may visit a museum just a few times a year. This is in great contrast to the time we spend in educational institutions and its different structures (Hein, 1998).

This thesis is positioned in a socio-cultural perspective on learning, communication and knowledge building. What Roger Säljö (2001) argues to be the essential challenge for the socio cultural view has to do with integrating physical and physiological tools (I.e. artefacts and cultural tools) into the understanding of human learning and thinking. Therefore the need for, as this thesis seeks to develop an understanding of, explore human interaction with cultural tools as part of their meaning making process. In the socio-cultural tradition the context or practice which the learning is situated in, is regarded as essential. Consequently I wish to explore the visitor interactions with digital media and the genre of digital storytelling in the context of the museum.

This form of pedagogical practice is a new intervention and to look at the student's contribution to the development of this process I see as essential in this context. These challenges are also addressed in my overall research question, which is related to the student *capacity to make a differenc*e. The concept of agency is related to user involvement and the student acting with accountability and authority and therefore I see this as a prosperous concept for guiding my analysis.

The main objective in this thesis is to explore the implementation of digital media in museum learning and the overall research question which guides the empirical analysis is:

In what way does the student's use of tablet computer technologies support their agentive learning in the museum?

Agency as the students capacity to make a difference can under the right circumstances be developed. Another object for this thesis is to gain knowledge on how digital storytelling is handled within the context of the museum, and therefore my second research question is:

How does the production of digital stories as part of a school filed trip to the museum facilitate the student's development of agency?

The production of digital stories is a genre already adopted in educational research and as part of projects in school. However, as part of educational projects in the museum it is a new development with few examples to refer to from research literature. Therefore, I will explore the phenomenon that occurs when this action takes place in the practice of museum learning.

1.3 Presentation of Thesis Case: Fast Forward Digital Stories

Related to the ongoing transformation in museum pedagogic Norwegian Museum of Science, Technology and Medicine and Norwegian Museum of Telecommunication joined forces to test out Digital Storytelling genre as a part of the Museum's program offered to visiting schools. The project is funded by the Cultural Council of Norway and has been developed in cooperation with the University of Oslo and Intermedia. Under the slogan *Fast Forward Digital Stories* they wanted to assess whether it is possible to employ and offer the genre digital storytelling as part of a learning activity during a one day museum visit in the museum environment and if it is within their capabilities. Consequently they needed to find out if it is doable in the time frame of a school visit and tablet computer was chosen as the technology that matched the requirements.

1.3.1 Objectives of Fast Forward

The museum is occupied with communication, learning and cultural awareness, and therefore the museum had several objectives with the Fast Forward project:

1) Explore digital storytelling as a pedagogical tool and its possibilities to facilitate projects such as the Voting Rights Anniversary in 2013 and the Constitution Anniversary in 2014.
2) The students explore the museums artefacts (both physical and historical) with the use of tablet computer technologies.
3) Use of tablet computer in the photography and editing process.
4) Produce digital stories as part of learning activity during a one day museum visit.
5) Further more the museum wishes to empower the visitor in the museum in activities of interpretations relating to objects and archives in the exhibition.
6) and to do this in the framework of Kunnskapsløftet 06 (school curriculum), hence the idea that the production of digital stories with tablet computer in the museum facilitate the school curriculum requirements of digital skills and competencies.

1.3.2 Bridging museum and School Learning

The Fast Forward project also wants to learn about in what ways the student's production of digital stories under a visit to the museum, facilitate bridging the two fields of learning in the museum and school-based learning. Issues related to strengthen the communication between the museum and the schools is an ongoing debate. Without doubt the museum wants and need an audience and from all age groups. One of many challenges for the museum is to find ways to relate to the premises that the systemic properties of the school are structured under. I.e. the school is under government objectification, hence and instrumentality with surveys, curricula and testing of student knowledge as primary agenda. This challenges the museum to find innovative ways to be an attractive collaborator with the school preventing the museum of marginalize it self as expert. Museums may easily become just an "extended classroom" governed by the school curricula not providing alternative learning initiatives. In the invitation sent do the invited school to Fast Forward Digital Stories, the museum used quotes from the Norwegian Curricula (kunskapsløftet 06) to legitimate the museum learning activities by giving examples of how the teacher could relate the visit to the museum to their everyday school practice. This legitimizing of the project into formal educational strategies

may consequently be argued to marginalized the museum in this context, but this is not a subject which this thesis seeks to answer. Anyhow, my understanding was that the museum educators did not create this educational program specific to adjust to the school curricula. They mainly highlighted for the school teachers examples of how the visit to the museum might be linked to the national curriculum and the everyday practice in class and school. Meanwhile it is essential for the museum to maintain their communal responsibility as a cultural mediator in society, serving both schools lifelong learning intetions and societal and civil issues. I am arguing that this ought to be practiced on the premises of the museum as the confident expert with distinctive properties regarding the students meaning making (learning) processes. I will address the properties of museum learning in chapter two.

There are challenges of collaboration with the school when the museum program does not meet the requirement and the needs of the school. This applies to the planning of the museum visit, planning and organizing activities under the museum visit and particularly programs that enables the schools to do preparation and complementary work before and after the museum visit. Hence the Fast Forward project focuses the before, under and after visit challenges by introducing digital storytelling production as a teaching tool that may bridge school learning with learning in the museum. In this manner this project also contributes to extend new learning technologies in the realm of digital media and communication technology.

1.4 Thesis Structure

With selected books and articles concerning museum and learning in a historic and contemporary perspective, chapter two will be an attempt to establish an overall insight into museum and learning and how this congregates with digital media. I will present models of learning developed in the field of museum learning to illustrate what is distinctive with visitors meaning making in the museum. Further I frame museum learning in the socio cultural tradition of learning and human activity.

Recent debate on creating participatory learning environments with democratic dimension has drawn the attention to the concept of agency. In chapter 3 Agency is debated in the tension between agent and structure. I will present agency with arguments from sociology and further discuss pedagogical positions towards the development and the fostering of adolescents as

agentive learners. Additionally, I will present agentive dimensions in the Fast Forward pilot and in digital storytelling

Chapter 4 is a description of the Fast Forward case with a special attention to the learning design, assignment and the learning resources facilitated by the museum. Descriptions of the physical context will also be attended to, as well as the physical organization of the activities in Fast Forward.

Methodological discussions are important to account for the reliability of my work. Reliability is related to if an in depended researcher would have come to the same conclusions as I have. Therefore, in chapter 5 I describe in detail my involvement in this project, my research methods, coding of the data material and my categories of analysis. I had no limitation on how to use the data material and I therefore see it as important to account for my choices and methods. Furthermore, I had no impact in the process of selecting the participants in the pilot tests, and related issues to the selection process needs to be discussed. Discussions about reliability and validity are also included.

In chapter 6 I commence empirical descriptions and the analysis of the empirical context. I present the empirical context divided in episodes and incorporate discussions related to my overall research question. By conducting interactions analysis of my observation videos I seek to answer how the Fast Forward pilot maintain the students as agentive learners and how the students in collaboration operate in the practice of digital storytelling production with tablet computer computers in the context of a school visit to the museum.

In chapter 7 I move I discuss further examples related to the empirical context as in chapter 6. This chapter is an attempt to comprehend the complexity of finding empirical examples of agentive actions and the museum supporting the development of the students as agentive learners and if my chosen theory and methods was relevant for answering my research questions.

In chapter 8 seek to organize and coordinate main findings and discussion from chapter 6 and seven, and furthermore discuss the relevance of my chosen theories.

2 Museum, Learning and Digital Technologies

> *Every museum visitor is a storyteller with authority. Every evocative object on exhibit is a mnemonic device. Every visitor interaction is story-making as visitors fit portions of our collections into personal frames of reference; most often in ways we neither intended nor anticipated (Tallon & Walker, 2008).*

Museum learning and museum educational practice has its own position in the educational field. The field of museum learning draws special attention to learning in exhibition spaces in relation to experiences with interactive installations, museum text labels and objects. This chapter is an attempt to grasp the complexity and what is distinctive with learning in the museum and what differs from other venues of meaning making. In this relation I also seek to position my thesis in the larger context of society, and further elaborate on how digital technologies are positioned in the educational field of museum learning.

2.1 Museum and Learning Theories

Learning in the museum has historically always been on the agenda of museum studies and museology, but after half a century without the main focus on this, it is yet again on the agenda (Hein, 1998). Additionally, lately museum education discussions focus on John Dewey and his theory of education and experience and his argument that a museum is a good example of how a school should be. "*The Museum can have a profound impact on children's motivation an interest in learning creating the kind of present experience that lives fruitfully and creatively in subsequent experiences"* (Dewey, 1963:27-28, ref. in Hall and Bannon, 2005:231). This is why museums have an important role in children's education, where they have opportunities to gain a deeper understanding and interest in the material culture and the history that it represents (Hall & Bannon, 2005).

George Hein (1998) explains how many successful and important actors in society tell stories about how their interest in their field was triggered after an experience in a museum, as a visit to the museum stimulates other forms of interest, motivation and learning than formal education settings at school. For a visit in the museum to be educative, the learning experience must be challenging and stimulating, and it should also be organized and designed to be educative (Hein, 1998). According to Hein (1998) the learners will seek to retain the position they already were holders of regardless of the instructions that are given. This is connected with the discussion on a focus of the subject or the learner. These issues are linked to a numerous of discussions. I.e. what is knowledge and how does knowledge come about? Is knowledge an objective dimension or only subjective within human thinking? How do we learn and what is learning? In *Human Learning* Jeanne Ellis Ormrod (2009) define learning as a long-lasting change and involve mental representations or associations and hereby a change as a result of experience. Learning is a process that involves mental representations as a result of experiences. New learning can be linked up to the previously stored associations. This way what is learned not always correspond with the educator intentions. *"As we enter the 21st century, we increasingly view learning as a lifelong process that involves repeated self-directed efforts to improve one's skill in not only academic and professional area of functioning but also personal areas of functioning."* (Schunk & Zimmerman, 2008). In the educational context learning does not only involves what is being taught in schools but the hole life world of the participants in total should be considered when conducting learning environments in both informal and formal education. Thus, the museum I argue must play an important role in young people's life-long learning and development.

Traditionally the main focus in museum communication is on the subject, i.e. what is to be learned, has been the main focus, but contemporary museum scholars have twisted this view and today concentrate more on how we learn and the process of learning in museums. In this way Hein suggests a constructivist view of learning, where attitudes and perceptions about how one is a "good" museum visitor in a particular class or group, also have a decisive influence on the response of an exhibition (Hein, 1998). The museums ' interest in learning is also motivated by survival and a legitimization of museums role in society (Hein, 1998). Recent years a strong interest in visitor participation in museum communication has followed the introduction of digital technologies and social media. The Museum's desire to promote participation has the same origin that other organization that is concerned with learning, education, and youth development, such as schools and after school programs. *"The prime*

focus being on young people's building of positive identities, on the democratic access and commitment to learning as well as on participation in decision making" (Stuedahl & Smordal, 2011a). Thus, in the later times it has been formed a strong belief in Nordic museum development, that the museum may be a link between education and overall youth development. James V. Wertsch (Wertsch, 2002) argues that the key issue in the field of museum learning is related to what outcomes we should hope for after a museum visit. Even to make the slightest analysis of development there must be present an idea on what this developments leads to, that it must be established a plan ends (Wertsch, 1998). This grounding is essential, in order to decide how to do further research in this field, as well as in order to understand and develop museum educational perspectives further. This, he says, brings us to the fundamental question about the development of motivation, learning, and identity in children which traditionally are based on research in formal education (Wertsch, 2002), thus the need for further research on these issues within the field of museum learning.

According to Falk and Dierking's research (2000), the richness and complexity of learning from objects and experiences are not yet fully included in the traditional theories and models of learning. Learning and experience from objects have a special contextual nature that it is important to take into account. The role of the context is as such an essential ingredient missing in the facilitation of learning from objects and experience. "*Much of the educational research has focused on learning in the classroom and in labs where there has been a de-contextualization from direct experience with object"* (Dierking, 2002:4). This is based on a perception that there is an inherent physical and socio-cultural nature in the experience related to objects This has an extensive potential to have an essential consequence for learning, and these processes includes much more than just the learning of facts and concepts. These include changes in attitudes, beliefs, aesthetic awareness, identity, etc., something Dierking (2002) believes is missing in the traditional research of learning.

There are distinct aspects related to the museum experience (Falk, 2002). The experience and learning related to physical objects and representations is directly related to context and what it represents for the viewer. Directly related to the case study of Fast Forward, is Falk's example of an airplane, which placed in a museum would perhaps bring to mind different experiences than if seen at an airport.

> And boot and plane assume particular meanings for the visitor only because he or she has a repertoire of experiences with boot footwear and flight, in particular. In the absence of such repertoires of

> experience, the objects would take on entirely different meanings than those intended by the museum *(Falk, 2002:x).*

This illustrates very well how the visitor's prior knowledge and experiences frame the meaning making from interactions with objects during a museum visit. Material objects represent more than just one reality and the museum is therefore an institution which may facilitate for placing these objects in a historical and cultural context, hence, the museum experience must be seen as something larger than the museum itself (Falk, 2002). If the visitor's experiences related to the museum objects are present, the process of meaning making during the museum visit take on totally different directions than if absent. This issue is handled in the Contextual Model of Learning which is presented in the next paragraph.

2.1.1 The Contextual Model of Learning & Free Choice learning

Falk and Dierking (2000) present in their work a frame for understanding museum learning as subjective and tightly bound to the individual's previous knowledge, experience, interests and context. Based on investigations and studies of learning in museums, science centers, and botanical gardens they have developed a model of museum learning that defines it as related to the personal, social and physical context, proving that in the field of museum learning, there has been a shift from a focus on what is learned to how we learn (Falk and Dierking, 2000, Hein, 1998).

Falk and Dierking developed a model to deal with the complexity and scope of learning and meaning making from objects and experience.

> The Contextual Model of Learning – starts from the premise that all learning is situated, a dialogue between the individual and his or her environment. It is not some abstract experience that can be isolated in a test tube or laboratory, but an organic, integrated experience that happens in the real world with real objects. In other words, learning is a contextually driven effort to find meaning in the real world. The model advocates thinking more holistically about learning as a series of related and overlapping processes that accommodate the complexity and ephemeral nature of learning and meaning-making from objects and experiences, learning that we call free-choice learning *(Dierking, 2002: 5).*

This approach to museum learning is based on using the concept free-choice learning instead of informal learning because it describes learning from objects and experiences better than to

describe it as what it is not (formal education) or where learning is happening (Dierking, 2002) . Free-choice refers to the open-ended facilities in a museum where the visitors can move freely in the exhibition spaces, and create meaningful and personal experiences. However, the learning outcome of a free-choice visit to the museum has been discussed. I will return back to this issue in more detail later. The Contextual Model of Learning suggests that three overlapping contexts contributes and influences the interaction and experiences children and young people have with the artefacts and the subsequent learning and meaning making. These three are: the personal context, the socio-cultural context, and the physical context. The interaction between these contexts is the process/product which leads to learning. Dierking argues that the Contextual Model of Learning is more descriptive than predictive. *The personal context*: the learning individual brings with them their interests, motivations, their preferences for learning and previous experience and knowledge. *The socio-cultural context*: recognizes that learning is both an individual and a group experience/experience. The learner is inextricably attached to the cultural and historical context where the learning occurred. *The physical context*: bring into question that learning does not occur in isolation from the artefacts and the experiences from the real world. This includes the structure and the anticipation of the circumstances and the sights, sounds, smells, and design features of the experience. In addition to these three dimensions, time is an important factor. Learning is constructed over time were people move through their socio-cultural -and physical surroundings where meaning is being built up layer upon layer (Falk and Dierking, 2000). What I would argue to be missing in this concept of learning is the term mediation (This will be addressed in paragraph 2.2.).

Traditionally in the museum field, studies of student learning are based on surveys that too often emphases on the implementation of the program in question and leaves the study of the visitors outcome open (Frøyland, 2010). *"It seems that museum educators forget the student's experiences and outcomes because they are to busy occupied meeting the schools needs and the requirements of the curriculum"* (Frøyland, 2010:108). It has been questioned whether anything at all is being learned in the museum but Falk and Dierkings (2000) research demonstrate otherwise. Even if the visitor does not necessarily learn what the educators or the developers would have predicted, their research shows that the museum experience to some extent facilitates learning for all the participants. The visitors were expected to increase general awareness and interest, but what was learned is highly personal and unique. Yet, what specifically is learned depends on the person's unique personal socio-cultural background, and

therefore will vary from individual to individual. The visitors bring their past experiences, interests and their own socio-cultural identity into the museum experience. Since learning is always influenced by the physical context, Falk and Dierking argue for a focus on the design of the exhibits and the design of educational programs of museums as having an impact on what the visitors are learning (Falk & Dierking, 2000, Paris, 2002).

After a Danish reform Anne Kahr-Højland (2010) developed a project for use mobile phones on an existing exhibition in a Science Centre. The Danish reform illustrates an increasing focus on educational methods and innovative learning resources (Højland, 2010), and Højland's educational tool was developed as a participatory tool to support student's scientific competence and to encourage interest. Using the visitor's own cell phone, they created a narrative layer as a personification of the experience of an existing show in a Science Center. Højland distinguishes between participatory design and design for participation. The first aiming for visitor involvement in the innovation of the process, and the other to innovate the product to be participatory (Stephenson et al., ref. in Simon, Nina, 2010). Participatory designs consolidate well with the arguments about learning, participation, and a digital world, and minds-on approaches in the museum. Højland presents a digital narrative or Augmented Reality (AR) – a digital extension of the physical environment which is determined by the physical context - "The personal exhibition". She refers to Oppenheimer (1968) who had the idea that a Science Centre should be like a forest of phenomena, focusing on free interaction. Højland says that from an educational point of view, this apparent lack of structure and a high degree of freedom make the visitors feel overwhelmed and inadequate (Højland, 2010: 505). This issue is also put forward by Jeffrey K. Smith and Pablo P. L. Tinio (2008). Their findings suggest that the visitor requires a mix between structure and freedom. With Højland's project's semi-closed structure of a participatory design (innovation the process) the representation/narrative lowered the experience of chaos and inadequacy, as visitors often experience in an open "free choice"-based exhibition. Højland believes that their choice of technology has origin in the potential of mobile phones to create a structure and a meaningful experience for young people in a Science Centre. With this technology one can produce a digital narrative that supports both individual and social learning processes (Højland, 2010).

Free choice *learning* has proven to have the potential to inhibit learning. If a learning context is characterized by total freedom and lack of structure it is likely be overwhelming and chaotic. Prominent writers and researchers in the field of museum research argue that digital

media has a high potential to counter this overwhelming chaos (Frøyland, 2010, Højland, 2010, Tallon & Walker, 2008, Bamberger & Tal, 2007). Digital media is therefore used as it has a potential to create a new learning ecology which may improve visitor interaction in the museum in connection to their personal context, socio-cultural and physical context, this in an attempt to enhance deeper understanding and more complex learning (Bamberger & Tal, 2007).

In a comprehensive study Bamberger and Tal studied (2007) about 750 students on class visits in four science and natural history museums in Israel. They utilized Falk & Dierking's (2000) *contextual model of learning* as their framework for learning in the museum, however they mainly focus on the *personal context* of learning. They too bring to the discussion the issue of free-choice learning. Their main objective was to focus on the level and types of choice which the students encountered during their school visit, and furthermore how different types of choices affect learning (2007). Their research indentified different levels of choice: no choice, limited choice, and free choice. Activities that provide *limited choice* were identified as the option which best comprehends the qualities of complex and more effective learning. In the extension of this study Bamberger and Tal (2007) have set up following items for a museum visit to be meaningful for students: 1. the students should be offered concrete task or activities that can only be implemented at the museum. 2. Task and activities should only be solved in collaboration with other students. 3. The lessons at the museum should be in close relationship with school education. In an educational program in the museum without choice or without free choice, the link between experiences and observations are absent and a limited choice program has proven to maintain this dimension (Frøyland, 2010).

2.2 Socio-Cultural Perspective in Museum Learning

This thesis is positioned in a socio-cultural perspective on learning, communication and knowledge building. This leads on to the (my understanding) core in a socio cultural perspective in learning and production of knowledge. We thrive, live, learn and develop accordantly to the cultural background we are a part of. Hence, acknowledgement, development and learning do not exist disconnected from our cultural affiliation. Knowledge

and meaning making is closely connected to the cultural and semantic recourses that the context provides and we learn within the framework of interpretations and way of thinking which these recourses facilitate (Säljö, 2001). Knowledge is related to cultural development evolved from hundreds of years of human activity, and other historical influences provide us with a diversity of choices (Imsen, 2005). The question evolves around whether human development is internally or externally influenced (Imsen, 2005). However, the different traditions of learning theories, most certainly practically emerge and a definitive empirical divide between them is uncertain. The behaviourist theories are positioned in an assumption that knowledge is somehow more or less objective and something to be discovered (Imsen, 2005). In learning and education the focus is then on externally stimuli as the cornerstone in human learning and development. Another direction in this regards is behaviourism's counterpart, constructivism. Constructivist theories emphasizes that knowledge only exists in the human mind and consequently not something objective to enquire and memorize (Imsen, 2005). These ontological and epistemological discussions illustrate perhaps the impossible mission to identify a clear and ubiquitous definition of learning (Säljö, 2001). Roger Säljö (2001) argues that the essential challenge for the socio cultural view has to do with integrating physical and physiological tools (I.e. artefacts or cultural tools) into the understanding of human learning and thinking. If to understand the interaction with artefacts and other people we must not fall under a reductionism where we understand thinking and learning as only what takes place in the mind of individuals (Säljö, 2001). Therefore the need for explore human interaction with cultural tools as part of their meaning making process (which is the objective of this thesis). Furthermore what implication this view has for what knowledge and skills which are essential to be learned in school and education. What Säljö (2001) argues to be the fundamental assumption of the socio-cultural perspective is in regards to the term mediation. If we remove psychological and physical tools and social practice in the study of human learning and thinking Säljö (2001) argues that: *"then we are studying helpless individuals who are deprived of their socio-cultural resources"* (2001:83). One person properties are limited, it is the collective nature of human that define our qualities (säljö, 2001). We build knowledge into artefacts and so development is always an extension of the previous, I.e. mediation (Säljö, 2001). Consequently Säljö's claim is that a direct subjective relation to our surroundings is not possible. We mediate with intellectual and physical tools integrated in social practice (Säljö, 2001). Hence, our perspective on these issues is illustrated in our pedagogical practice. To day, learning is seen as an active participation by the learner

with the environment, which relates to the overall discussion if knowledge is objective or subjective constructed (Imsen, 2005, Säljö, 2001).

The Contextual Model of Learning (as discussed in 2.1.1.) adapts into the socio cultural frame of viewing meaning making. However, they do not seem to incorporate a detail study of the property of mediation with digital media technologies in the museum. Recently, Falk and Dierking (2008) have discussed the Conceptual Model of Learning in relation to digital media. They highlight three potential aspects which may enhance visitor learning: 1, enabling visitors to customize their experience to meet their personal needs and interests. 2, extending the experience beyond the temporal and physical boundaries or the museum visit and 3: layering multisensory elements within the experience, thereby enriching the quality of the visit (Falk & Dierking, 2008).Yet, they emphasize that there has been few studies on learning outcomes with digital media in the field of museum learning. With my thesis I seek to contribute with insight into this issue. In a summary of their findings and other similar studies Falk and Dierking (2008) suggests that visitors learning are reflected in: motivation, expectation, past experience, interests, the opportunities of choice and control. In this relation they conclude with that the personal context to be more influential on learning than the physical context. The technology must facilitate for use that potentially personalize the visit Falk and Dierking, 2008). Hence, I see the importance to gain knowledge about how digital media (i.e. digital storytelling with tablet computers) is used in the practice of museum learning, in connection to choice and control. In addition, I will analyze choice and control under the authoritative and accountable properties of the concept Agency (I discuss agency in chapter 3).

2.2.1 Museum learning and Digital Media.

Whenever new technology arrives it emerges among the old and therefore often used in the same mindset. Consequently few technologies originally were developed for its present use and this relates to what Wertsch (1998) refers to as spin-of which means that the technology used originally was made for something totally different and requires new ways of thinking and doing things. Furthermore this means that the new technology may require different skills and competencies than first recognized and the system or profession in which it is situated would want to explore to facilitate a comprehensive understanding. Even though the use of

digital media and communication technology in no order would be any different the notion of interaction and communication alters the perspective a little which requires special attention in the context of research on learning with digital media in the museum. In this regard Wertsch (1998) outline the perspective on how mediation with cultural tools constrain as well as empower human action, and he discuss how our emphasis is often on the empowerments rather on the constraints, but it is important that we focus on the limitations at the same time and how tools also shape our action in an inherently limiting way. When digital media is a new phenomenon in the profession of museum learning issues on constrains as well as empowerments needs to be investigated.

John Seely Brown (2000) is discussing how we can imagine a future of learning ecology where learning, work and play fold together and he argues that learning becomes ubiquitous (Brown, 2000). For Brown the internet is a media that honours several forms of intelligences, abstract, text, visual, musical, social and kinaesthetic. This facilitates for the ability to construct a learning environment where young people have the opportunity to engage in learning on their own optimal way (Brown, 2000). The skills and literacy of information navigation is in Brown's understanding of media literacy, which argues for a move beyond text and image: the skill of being ones own librarian. This I connect to the development of student agency (which I will discuss in chapter 3). In the educational context, this will lead to a dominance of discovery-based learning (Brown, 2000). Based on Brown's understanding of future learning ecologies and the role of media literacy, we could understand the museum as a constructive object for studying and developing a learning environment that enables and facilitates digital media's position in today's theories of learning. When the society of today is facilitated with the technology to brows information on internet and on online museum archives, issues as qualified educators and limited resources present itself. What follows is a presentation of a report on the implementation digital media for educational purposes in USA.

In a comprehensive report from 2011 named *Digital Media and Technology in Afterschool Programs, Libraries, and Museum*s, the challenges of and the condition of the integration of digital media and technology in informal learning venues in the United States are highlighted (Herr-Stephenson, Rhoten, Perkel, & Sims, 2011). Their analysis of these issues illustrates the various challenges of developing and promoting projects for young people in the view of digital media and technology. These include traditional structures such as limited resources, lack of qualified personnel and the current discussions about what youth should and should

not do with the information and technology in a cultural context. They also refer to conflicting priorities as access to computers and internet and for social demands on developing digital literacy. How this is resolved, are closely linked to the organization's attitudes toward young people as citizens, learners and as users of media and technology. The report points to the attention of three organizational goals for children and youth on the agenda of the museum: 1. Learning through cultural education for children, 2. Teaching towards content-education for children, and 3. Educate teachers about the value and legitimacy to supplement the school curriculum with the museum programs. And also the authors of the report divide the introduction of digital media into three categories: 1. digital media and technology as content, 2. digital media and technology as outreach, and 3. digital media and technology as a hook (attract). This illustrates the complex dimensions in the discussion about how to approach learning in the museum and the introduction of digital media. This report briefly presented here is from the United States, but in a global digital world the points made also seems relevant and informative beyond this report's context.

Digital media have contributed to a new direction in the discussion about participation in the museum. Museums predict a large potential in digital media as a tool for bringing the museums conversations beyond the museum (Stuedahl & Smørdal, 2011b). The potential lies in issues related to user participation and contributions to content, which extends previous ideas about the interaction and hands-on technologies in the museum (2011b). Today's exhibition technologies and communication tools for museums may be personal, individualized and trigger social interaction. And therefore today we also speak of minds-on interactions (Hein, 1998). In the debate over an expanded literacy-concept there are arguments that the social and cultural integration of technology into the youth's learning environments fundamentally intertwines with young people's daily lives outside the educational institution (Stuedahl & Smørdal, 2011b). Furthermore, these arguments are as well linked up against perceptions that learning ecology has been extended beyond its roots in development to also deal with the links between context and resources for learning including digital media and technology (Stephenson et.al, 2011).

The emphasis on youth participation in museum communication and learning is related to an argument of following the same cultural patterns as their participation and learning in leisure contexts. This is in connection to socio-cultural perspectives on youth media literacy, also including frequent arguments that there is great need for framing technology in educational

theories. Smørdal and Stuedahl (2011b) argues that an emphasis on how meaning is produced in youth everyday media practices based on their collaboration and semiotic and social literacies, the socio-cultural background as well as the previous knowledge that they bring into the museum, is relevant to utilize when digital media are to be integrated into youth participation in museum learning.

Another aspect of museum learning and digital media is put forth by Palmyre Pierroux (2012) referring to a need for research that takes into account the impact technology has the relation between classroom learning and learning in school field trip to museums. She argues this issue to be particularly important due to refraction between the open and enabling structure and shape of new social networking technologies and more traditional closed down knowledge transfer practices in schools and museums. On school field trips some of these technologies move with the students out of the classrooms to other settings that are seen as non-digital, as for example in the Museum. Consequently, there is a trend in contemporary education research looking at the potential of prevailing technologies to support learning in and across contexts. This way Pierroux direct the discussion onto museum learning, where there is a growing interest in exploring how technology can be used in learning activities. There are studies that examine how discourses, online games, mobile phones, and a wiki-based learning environment mediate meaning making and commitment (Pierroux, 2012).

The importance of the institutional impact on the formation of meaning making during a museum visit is an empirical and theoretical issue in research on museum learning (Pierroux, 2010, Hein 1998, Dierking, 2000, Paris, 2002). A new mindset has emerged with new technologies, such as with the museum visitor's motivation to document and share the experience on the museum's website or on other social networks (Pierroux, 2010). Such a view promotes social interaction, interaction with the physical environment and the visiting student’s meaning making work in museums. Digital media may prove to be a fruitful mediator in this process.

2.3 Summary

The museum as an educational institution is in ongoing transformation simultaneously with societal developments. Digital technologies alter the way humans communicate and make

meaning of the contemporary world we live in, and in this chapter I have presented discussions on issues related to the implementation of digital media technologies in museum learning. I addition I have discussed museum learning in relation to socio cultural perspectives on learning and development in an attempt to frame these discussion into theories of learning in the museum. The Contextual Model of Learning and the concept of free-choice learning has proven to be a prospective analytic perspective when researching learning in museums and science centres, and limited choice visits to the museum is found to be the most prosperous for learning outcomes. These theories show us the importance that the museum programs give the visitors opportunities to relate their interactions in the exhibitions with their previous experiences and their socio cultural background. Nevertheless, this is obviously not an easy commitment.

In the next chapter I will present the concept of agency which is highly related to the concept of free-choice learning in museum learning.

3 Agency and Learning

Resent debates regarding participation and democratic initiatives in education and museum learning and adolescents life has drawn the attention to agency and individual and collective capacities to make a difference (Erstad & Silseth, 2008). This capacity may be seen as situated in the individual and/or in a group where the context is essential. This is strongly connected to choice and the motivational features of agency. Agency as a capacity is situated in the context and practice, and young people's lives in connected to multiple practices and so research on all of these contexts are relevant. I will begin the discussion on agency with arguments from social science which leads on to a discussion on agency in the Fast Forward pilot and digital storytelling.

3.1 Agency in Social Science

The term Agency has been widely discussed and debated and is being associated with a long list of terms: selfhood, motivation, will, purposiveness, intentionality, choice, initiative, freedom, and creativity (Emirbayer & Mische, 1998), and choice and freedom are strongly related to democratic dimensions. To discuss and elaborate this term further it is essential to explain correctly in which direction it is being assessed and associated. Anyhow, all of these above related terms seem to incorporate some kind of energy or action (physical or mental energy) by the agent, but we can both look at agency with origin within the agent and/or we can look at agency from the viewpoint of how it is facilitated for the agent to act agentic in the structural environment. Anyhow, agency implies an attitude that agents are not passively participants (and needs to be treated accordingly) within their surroundings and in their own lives. Emirbayer & Mische places the discussion of agency in the age-old problem of free will and determinism:

> How are social actors, we ask, capable (at least in principle) of critically evaluating and reconstructing the conditions of their own lives? If structural contexts are analytically separable from (and stand over against) capacities for human agency, how is it possible for actors ever to mediate or to transform their own relationships to these contexts (Emirbayer & Mische, 1998:964)

This way they emphasize the need to focus on the agent, thus incorporates both the individual and the structural components and to a certain extent a "mix" of free will and determinism. Further, they argue we must look at agency as *"..composed of variable and changing orientations within the flow of time."* (Emirbayer & Mische, 1998:964), hence agency is not a fixed variable but a ratio between agents, contexts altered trough time. To follow up this discussion to the complex dimensions of agency we again look at the writings of Emirbayer & Mische who present contemporary conceptions of human agency as being traced back to the Enlightenment debate over whether instrumental rationality or moral and norm-based action is the truest expression of human freedom, which again initiated a belief that people in a social contract between individuals has the capacity to shape their own lives (Emirbayer & Mische, 1998). In this relation Kumpulainen et.al argue: *"The students need to be treated as an active subject, not just as an object of upbringing and education"* (Kumpulainen, Kristiina; Krokfors, Leena; Lipponen, Lasse; Tissari, Varpu; Hilppö, Jaakko; Rajala, Antti, 2009:27). The active subject is related to be an agentive learner who gets the ability to develop into a self-directed learner. These authors see agency as an important feature which gives the actors a sense of capability to gain authorship and commitment to their community and to their environments. However, they also argue that *"agency is not a condition for action but an outcome of action and participation"* (Kumpulainen et.al., 2009:30). Agency as concept gives one a belief that we actually can change, shape and that we have an influence up on our own lives. This is of big importance to which extent we pursue our efforts to influence matters that involves others in and around our community (Kumpulainen et.al., 2009). This means that agency gives the actor a sense of autonomy but agency in it selves is an outcome of action, and develops "in action". Until this point agency is established as some form of competence capacity (for actions) from experience and a belief that one can act agentic. Emirbayer & Mische's view on the analytic dimensions of agency lies in an escape from one-sided conceptions to show us the complex interplay within different structural contexts of actions:

> Theoretically, our central contribution is to begin to reconceptualize human agency as a temporally embedded process of social engagement, informed by the past (in its habitual aspect), but also oriented toward the future (as a capacity to imagine alternative possibilities) and toward the present (as a capacity to contextualize past habits and future projects within the contingencies of the moment). (Emirbayer & Mische, 1998:963).

That is: with previous experiences the agent has more or less the capacity to imagine future possibilities and consequences and further contextualize this anticipation towards the

eventualities of the present. If understood correctly this sense of agency has origin in previous experiences. Therefore participants in learning environments must be given these experiences, and in all the different setting which they live, thrive and learn. Experiencing agentic capacity in one practice of education does not necessarily suggest that this capacity and experience can transfer to another.

In a study of children's own sense of agency agentic children is regarded as:

> persons capable of taking informed and responsible action in relation to their own life and their social and material surroundings, people who do not passively let life happen to them but rather strive to transform and better the circumstances they occupy, namely act as authors of their lives *(Hilppo, Lipponen, Kumpulainen & Virlander, unpublished)*

Comparing this definition to Emirbayer & Mische's one can see the latter wider approach: *"..agency itself remains a dimension that is present in (but conceptually distinct from) all empirical instances of human action; hence there are no concrete agents, but only actors who engage agentically with their structuring environments* (1998:1004)." Emirbayer & Mische's claim is that agency is always present in observable human action. Hence, an acting agent is always acting agentic and agency is socially situated and distributed because of the agent's engagement with the environment. In the discussion whether we are free actors or products of a pre-motivated determinism, Emirbayer & Mische (1998) conclude that a completely determined and structured human action never will be present in empirical social action, although agency is never totally free of structure. Agency is then, a temporally socially engagement with the structure in acting environments, never totally determined or structured nor never free of structure, analytically situated within the flow of time.

Bruner has defined "agency" in psychological terms as "the initiation of relatively autonomous acts governed by our intentional states—our wishes, desires, beliefs, and expectancies" (1994, p. 41, ref. in Hull, 2006). Bruner's definition may prove to be essential for my analysis. However to suggest to what extent one empirically can observe these initiations (psychological) of autonomous acts is problematic. To identify an agent's wishes, desires, beliefs, and expectancies may prove to be difficult. It is a thin line of differentiation between the initiation of autonomous acts, governed by the agent's wishes, desires, beliefs, and expectancies, and acts governed by the initiation of expectancies from and by the environment. Environment in our context relates to the assignment in Fast Forward and

expectancies from the museum educators, and the expectancies formed by the student role. The student role relates to the fact that the students are on a school excursion. I.e. there are expectancies related to being a member in the educational context. One example is assessments criteria which follows working with an assignment in school. Anyhow, by giving the students choices, one can at least imagine them initiating autonomous acts originated in motivational factors as wishes, desires and beliefs.

3.2 Development of Human agency

Agency is closely related to context and the changing aspects of time, i.e. an agent may act more or less agentic in one situation in relation to others, and the aspect of time play a central part in the development of agency, and further more, agency can develop "in action".

> (..) importance of intersubjectivity, social interaction, and communication as critical components of agentic process: agency is always a dialogical process by and through which actors immersed in temporal passage engage with others within collectively organized contexts of action (Emirbayer & Mische, 1998:974).

To illustrate with an example from a real-life situation how structural environments are altered trough human agency (Emirbayer & Mische, 1998), I will use a story from Dorothy Holland et al.(1998) book *The Woman Who Climbed up the House.* Doing ethnographic work in Nepal, interviewing member from various castes sitting on a second-floor balcony, they experienced a woman from the lower caste climbing the outside of the house to enter the balcony. The woman in her fifties a member of the lower caste Sunar, due to her status as a lower caste, is prohibited to enter houses from higher caste people. Anyway the woman found a way up to the balcony to the interview without entering the house. What was interesting was that Skinner and Holland found that this was not only a cultural situated action conducted by the lower caste woman. There was no evidence that implied that this was a custom way for the community's lower caste women to enter a house, nor this specific woman, but there was evidence of an improvisational nature of the action. The situational context provided the woman with a problem in which she acted in a spectacular improvisational way (Holland, 1998). Even though a person in a lower caste is a suppressed ethnic group in the society, and to that extent has limited possibilities to develop and experience agentic actions, the outcome of her action was an empowerment of her agency. Moving back to the discussion on agency

this story illustrates an optimistic view on human capabilities and free will. To create agentic possibilities in learning environments does not imply that one can totally remove an agent's capacity to act agentic. However, it is essential to bring into question how the learning environment creates agentic experiences. The sense of agency and authorship is formed by past experiences, and therefore the importance to guide and facilitate for experiences with agentic references to further develop the students agency. Agency is a dynamic variable and the context plays a central part.

Agency can be developed and is an outcome of action and participation in learning (Kumpulainen, et.al. 2009). This view is in big contrast to a dominant view on agency in contemporary American sociology represented by voices as Pierre Bourdieu and Anthony Giddens who sees human agency as: *"..habitual, repetitive, and taken for granted."* (Emirbayer & Mische, 1998:963). Human agency is the will to live, to experience and to act (1998) and is always present in human action. To emphasize: Human action is agentic action and can more or less be developed, and the practice in which the agent is interacting and participating in, may determine to which extent it is developed. The environment can promote this development if the actors are given the role of active thinkers and doers (Kumpulainen, et.al. 2009). Hence, in the relation to education and learning, teachers, museum educators, parents and the society in total, needs to acknowledge also the agentive subjectivity in social action. We need to acknowledge the changing aspects of the world that the adolescent of today grow up in, and therefore the need for a structural facilitation for developing epistemic agency. The ontological and epistemological social world of today is in constant change, and this has implications on how we think about meaning making processes.

Epistemic agency is one concept of agency often linked to a democratic society were agents are empowered to act democratic (Erstad & Silseth, 2008). Erstad & Silseth define agency as *"the capacity to make a difference (..)"* (2008:216), and they emphasize the importance of bringing the cultural codes of the informal into the formal environment of school to create authentic learning environments. Epistemic agency comes into question when the students get the opportunity to create new knowledge, where the goal is to facilitate for the students to develop an understanding of knowledge production. This way the school's epistemic world is challenged and knowledge not something fixed and concrete but something to enquire and search for in diverse ways (Erstad & Silseth, 2008). Epistemic agency relates to learning

situations were agents negotiate their ideas with that of others and not just fall cognitively under the teacher as an authority of knowledge (Scardamalia, 2002, referenced in Erstad & Silseth, 2008).

The implementation of ICT has been questioned and challenged and seen as an distracting element in the classroom (Pierroux, 2012), but following Erstad & Silseth (2008) I argue that the school must provide authentic learning environments, where i.e. ICT play a major part in the out of school contexts of adolescent's lives. The concept of agency as outlined above is an important feature to understand what these authentic learning environments includes and concede. Agency is the will to live and experience (Kumpulainen, et.al. 2009) but for the purpose of my analysis of museum learning I need to conceptualize it more explicit to be able to operationalize agency analytically. An issue I will return to later in this chapter.

3.2.1 Analytic Perspectives on Agency

There are numerous extending concepts of agency in contemporary discussions. In a project in Finland the researchers investigated children's sense of agency in everyday life (Hilppö, Lipponen, Kumpulainen & Virlander, unpublished), and they got their analytic perspective from the semiotics of A.J. Greimas on modalities of agency:

> to want, noting what the character wants to do; to know, referring to the knowledge and know-how of the character; to be able, indicating the physical abilities and limitations of the actor; have to, referring to a must or something that the actor has to do; to feel, experience, appreciate, referring to the characters ability to feel and experience, and lastly; to have the possibility, indicating possibilities to do something in a given situation. *(Hilppo, Lipponen, Kumpulainen & Virlander: 2).*

Their analytic outcome resulted in two manifestations of agency in a learning perspective: *thin and thick sense of agency*. Thin sense of agency: when one or two of their analytical modalities of agency, were in the children's reflection, only casually noticeable: *"This means, the connection between the child's competencies, aspirations or possibilities for action and the practice was minimal or one sided when compared to other practices." "In comparison, a thick sense of agency was indentified when multiple modalities were manifested and expanded on in the reflection situation* (Hilppo, Lipponen, Kumpulainen & Virlander, unpublished:5)." This illustrates how the sense of agency is strongly related to the children's reflection of

previous experiences. The researchers conclude that the children's sense of agency is not a fixed "size" but changing in variation within different practices, and further more; To educate agentic learners, the learning environment we create must provide situations that situates the student in doing something for them important and valuable (Hillpo et.al., unpublished). I connect this argument with increased student motivation.

Conceptual agency, material agency and disciplinary agency are other analytical categories of agency (Greeno, 2006). Conceptual agency relates to learning that has generality which extends beyond what one has been taught explicitly to do. Material agency conveys the affordances and constrains of a material system, and disciplinary agency the action outcome depends of the established process of a discipline (Pickering, 1995, ref. in Greeno, 2006). In these analytic concepts of agency structural components seems to be highlighted, however Greeno emphasize the importance of conceptual agency for the agent to be more freely disconnected from structure:

> But if students learn in a situation where their agency is limited to acquiring skill in performance of prescribed procedures (Pickering's, 1995, disciplinary agency) or operation of apparatus to obtain prescribed empirical results (Pickering's material agency) and then are asked to solve problems in which they need to adapt or extend what they have learned to a novel problem (i.e., to act with significant conceptual agency), it is likely they will be ill equipped (…) *(Greeno, 2006:540).*

To be the holder of material agency and disciplinary agency but only limited competence of conceptual agency does not imply the absence of free will and agentic actions (as outlined in the agency discussion earlier in the chapter), it mainly implies that what is learned has no use in other practices. *"Agency is constructed and manifested in actions of testing and goes beyond the limits of what is required and allowed (Engestrõm, 2007).* However, Kumpulainen et.al (2009) distinguishes between normative agency and authentic agency stating that a person acting with normative agency is acting in compliance with the norms outlined, and authentic agency relates to "broken norms". Children seldom question or initiate what they know most likely is not achievable, hence the authors put forward a claim that participatory pedagogy is a constructive opportunity to foster children's agency, and in this way to facilitate for experiencing authentic agency. There is therefore a need for participatory learning environments, so that the students can be facilitated by history, to imagine future possibilities to act agentic and therefore act agentic in the present moment. However, there is a difference between participating and activity in relation to the idea of participatory pedagogic in this context.

Summarizing the different conceptualizations of agency outlined in this chapter an overview of these concepts regards to the relationship between agent and structure emerges. Trough out the chapter I have moved trough the historical perspective of free will and determinism and to the contemporary theoretical analytical concepts of agency. I will now move on to discussions on agency in museum learning and the Fast Forward project.

3.2.2 Agency in Museum Learning

After the above discussions one can attempt to imagine how the relationship between the agent and structure unfolds empirical. All human action is agentic actions, however to which extent a person act in an innovative creative fashion is another question all together. A person acting is free to select and collect within the possibilities and constrains, what is permitted and possible in the disciplinary structure of the domain interacting with. There will always be a structural dimension to human action. Therefore, as several authors referenced to in this chapter argue for, we must structure differently to promote the fostering of agency.

Theories about agency empower agentic actions with accountability and authority (Greeno, 2006, Kumpulainen, 2009). There are arguments that the agency is a capacity to make a difference. This capacity is located in the structures and in the individual, and will impact learning in the museum as much as in school. Museums has physical facilities containing the possibilities to give the visitor choice and freedom, with its big open-ended spaces with numerous of exhibitions. The challenge would be empirically to distinguish between structural actions and agentive actions in the context of museum learning. Both way, there are different levels of agency as concept, and distinctions between normative and authentic agency is made. I have earlier described how normative agency is acting accordingly to expectations, and authentic agency relates to "broken norms". Here, the agent is made accountable for both structural actions and individual actions - any action is agentive. Anyhow, the museum must be aware of the complications accompanying the idea of agency and free-choice learning (as described in chapter 2). To be able to act with accountability in the museum requires the right to participation and choice where the agents personal experiences and interests outside of the institutions is seen as equal with the museum institutions own expectations and interests. Theories about agency give us insight into how agency can be developed through experience and thus expectations of a facilitation for and

recognition of agentic actions. The Museum space and the idea of free-choice learning provide a context similar to such agentic learning environments. I see negotiation and choice as a product of experienced agency. However, to empirically establish good arguments that the students negotiate without using interview as method is problematic.

A question which remains to answer is how to relate this to the concept of agency. According to Vygotsky (Wertsch, 1998) we mediate in the world trough cultural tools where the language as the most important tool. Agency is acting accountable and authoritative (Kumpulainen et.al.2009) where the agent is acting in the present by projecting and anticipating future possibilities with past experiences. Therefore, arguments to promote student experiences with agentic learning environments hence facilitate student development of agency - their sense of agency. To enhance interest and engagement the learning environment should facilitate the use of students funds and cultural codes and the students subjective voice (i.e. in digital storytelling). This is important to construct the accountability of the individual. Personal experience and knowledge must be seen as an important feature of student's meaning making processes.

To be a participating individual with authority in the museum is about more than just activity. I personally interpret participatory pedagogy, as an approach where the individual is participating in the whole process and is seen as equal in the thinking processes behind the ideas which the teaching is based on. Olga Dysthe (2012) promotes dialogic pedagogic as a promising approach in museum learning. Dysthe supports her statement with Bakthin and his followers who argue that in dialog we are all equal. In dialog we learn from each other, whether we are teacher or student, expert or not. This requires that the educator ask questions him or herself not know the answer to (Olga Dysthe, 2012). In this manner the museum educator can learn from the students and the student becomes a participant in the learning session. If we seek an understanding of the contemporary youth culture and connect it to education in the museum it is with the youth we have to find the acknowledgment. If we follow the voices who promote participatory learning environments in, we have to look at the actual practical consequences for implementing such a view point. Hence, what does it in reality indicate to develop participatory learning environments in the museum Participatory pedagogic, I argue, must take into consideration what the student's brings with them of knowledge and personal experiences into the learning practice.

3.2.3 Agency in Fast Forward

The museums are the possessors of authentic historical and cultural artefacts and interaction with these is possible only within the context of the museum. Furthermore, the museum as an institution is an expert very few teachers in the school can compare themselves with regarding cultural communication. There would perhaps be a legitimate argument that one could interact with a photograph of the same artefacts in school. Anyhow, in Fast Forward it is the activity of photography interaction with the authentic object trough the tablet computer, which certainly is impossible in school. This way the context and practice of learning in the museum differs from formal learning in school. The process of photography as organized in Fast Forward facilitate choice and the students with the production of digital stories, they also contribute to the production of information. Choice is strongly related to agency, hence the Fast Forward foster (in theory) foster the agentive learner. The museum space and the notion of free-choice learning entails the properties of an agentic learning environment and the theories of agency contribute with curiosity and understanding in this relation.

Human agency as described in the this chapter on agency analytical perspectives on agency, contains several different analytic concepts: Epistemic Agency, Material Agency, Conceptual Agency, Disciplinary Agency, Authentic Agency, Normative Agency are among the terms used. Additionally thin and thick sense of agency is another outcome after researching student's sense of agency. To frame my analysis within the concept of agency, if not developing my own term, I need to conclude with how and with what conceptual term or terms I build this framework with. How to conclude with student acting agentic? One method would be to do an analysis on if and how the assignment facilitates for student agency and then use this as a framework to answer this question. This way one can establish insight into what choices of actions which are already made for the students within the framework of the pilot study, and this way avoid confusing "already made actions" with agentic actions. First it is important to divide structural and non-structural aspects. For example: what choices of actions are already made for the students in the pedagogical program Fast Forward? Another important aspect is the fact that this kind of program is new for the students hence a likeness to the "Woman who Climbed up the House." The student agency is situated in the context, hence the need to empirically study the agentic outcomes when the students act in an environment (museum and digital media production) radically new to them. This kind of learning in the museum is a new development. In this pilot study the students, teachers, the

museum educators and the researchers meet challenges which are different all together than previous experiences with educational work in the museum. Regards to the accountability of the visitor which the museum seeks to facilitate for in Fast Forward, the students probably in general need to have previous experiences with participatory learning environments to make use of this affordance to its fully potential. Therefore to which extent an analysis of the student's agency in the work with the assignment in this pilot study has a prospective future is a question yet to be answered. To what degree the assignment facilitate for agentic actions in the museum is more promising, however, if the observation video empirically gives us clues about student acting agentic is another issue.

3.2.4 Agency and Digital Storytelling

One could frame digital storytelling in the ever existing digital environment without any further details (Haug, Jamissen, & Ohlmann, 2012). However, for the purpose of this thesis I position digital storytelling in the explanation made by Centre for Digital Storytelling (CDS) in Berkley USA. CFD is seen as the originator of digital storytelling as it is adopted within educational practice today. In this tradition a digital story is 2-3 minutes long, and can contain photographs, music, sound effects, illustrations, and a voiceover by the storyteller(s). It is within this framework digital storytelling is used in Fast Forward. The storytellers own voice and personal contribution is seen as the core feature in the CDS-model (Lambert, 2009). Digital storytelling is an ongoing movement in educational science. Voices in Europe and America promote this relatively new pedagogical invention with origin in USA (CFD) for its democratic potential for peoples voices to be heard (Lundby, 2008). Both in out of school programs and in formal educational contexts the productions of digital storytelling have been research. I will here present two projects which both researched agency and digital storytelling. The first project I will present is from USA where Lynda Hull and Mira-Lisa Katz (2006) research the production of digital stories in a community technology centre called DUSTY (Digital Underground Storytelling for Youth), followed up by a projects at a Lower Secondary school in Norway researched by Ola Erstad and Kenneth Silseth (2008).

Although the DUSTY project is situated in an after school community and in contrast to the Fast Forward project draw special attention to developing an agentive self highly trough self-presentation, it illustrates the agentive potential working with digital storytelling. It is the

context and the structural aspect which frame the agentive stances working with digital storytelling, an issue which I will return to in the analysis and discussion in chapter six and seven. Hull & Katz with ideas on how to foster agency, found that the participants at the DUSTY project with digital storytelling, authored themselves trough language, music, and images, agentively negotiated an agentive self as storytellers. Images of historical people was recontextualized and combined with their own imagery related to their own lives' people as family and peers. Their findings suggests that the participants in DUSTY was facilitated with the means of reposition themselves as agents and authors of their own lives (Hull & Katz, 2006:34). They also argue that the enthusiasm and motivational factors working with digital storytelling is positioned in the framework of DUSTY. The participants were presented an atmosphere where one was listened to and encouraged to speak their minds, and where they was treated as equal members of the community and supported to *"..create authoritative texts which embodied agentive selves."* (Hull & Katz, 2006:36). The multimodal (language, music, imagery) dimension of digital storytelling entails agentive stances where the producer most likely are able to find motivational interests as media contents in close relation to their own identity. This factor is strongly evident in the DUSTY, although as my opening argument imply, the DUSTY project draw a special attention to self-presentation in contrast to Fast Forward and projects in school where digital storytelling most often are handled within the framework of a theme subject.

Erstad & Silseth (2008) frame their discussion in the transition between informal and formal education. In this relation I contrast their work in a formal learning environment with DUSTY as an example of an informal learning environment. Like Hull & Katz, Erstad & Silseth research digital storytelling with the concept of agency. Erstad & Silseth argue that digital storytelling which origin from production activities outside of formal education, is a prospering way of engaging young students in a more personal manner. They researched the productions practices in an eight grade class at a secondary school in Norway working on a project called "Young Today". Their focus was on one particular group's production of digital storytelling. The teacher expressed in interview how the genre of digital storytelling is an engaging method especially for the students low-performing in traditional written assignments, empowering them with an agentive potential. Furthermore, she states that this potential of self-governed students involve open-ended assignments. Consequently, the agentive potential in digital storytelling lies not solely in the genre itself, but mainly in the structural dimensions. For educational purposes the assignment that follows the practice of

digital storytelling production needs to facilitate some form of choice to obtain these agentive potentials. The research shows that especially for students who struggle with presentations in front of the class, digital storytelling gives them an opportunity to present using their personal voice without "face to face" interactions. Agency as a capacity to make a difference is originated in the young to be given the opportunity to incorporate the knowledge and experiences obtained from outside educational practices as a potential was to foster agency (Erstad & Silseth, 2008). The students researched in the "Young Today" project, produced a story about computer gaming, specifically a popular game amongst their age group, an online role-playing game World of Warcraft. The students expressed an exiting aspect of this exercise. They got the opportunity to get their voice heard by being able to inform people outside the gaming community about what they are doing. According to the students the gaming community is being stigmatized as "nerds" and the students in question welcomed this opportunity to present their gaming practice as means for escaping this stigma. Erstad & Silseth's findings suggest a great agentive potential in the practice of digital storytelling within formal education. However, they argue for challenges related to educational assessment criteria as giving grades, and that digital storytelling becomes only a playful activity. This is expressed by the teacher who se that often the students create professional stories with no traces of the personal, and Erstad & Silseth argue that this maybe because the digital stories are to be graded by the teacher. I related this to the development of the agentive learner. If the students are given this authority with the capacity to make a difference without previous experiences in such a learning environment, they most likely do not have the skills to maintain this capacity. Becoming an agentive learner is connected to development which expands the specific temporary context.

I have now presented research from two different contexts as examples of informal and formal learning environments. In relation to agentive stances the practice of digital storytelling belongs in transitions between the informal and the formal (Erstad & Silseth, 2008). In the Fast Forward pilot the students are given the choice and authority to combine knowledge acquired during the museum visit with knowledge and experiences acquired elsewhere. Although, as the teacher in "Young Today" experienced, the students I have researched did produce digital stories which were more professional stories than personal, anyhow with a personal dimension. Even though the students in Fast Forward were not intended to be graded, they may have been feeling that they were being assessed by me who followed them with camera during the hole visit to the museum. I will discuss these issues

presented in this chapter when analyzing and discussing my research findings in chapter six and seven.

Ola Erstad and James V. Wertsch (2008) refers to Jerome Bruner (1996:22) who shows how important collective works are for producing and sustaining group solidarity which again assists the making of a community. The students in Fast Forward presenting their group work to the rest of the class are one example of this statement. Erstad & Wertsch discuss narrative as a cultural tool and the implications related to the introduction of new cultural tolls, such as digital storytelling. In the context of this thesis narratives are an essential part of practicing digital storytelling. The museum is the beholder of an objectified narrative closely tied up to the museum archive. Therefore, I set the idea of an objectified narrative in connection to the traditional way of visiting a museum with a guide as opposed to use a tablet computer and digital storytelling as a newly developed cultural tool. Introducing tablet computer and digital storytelling production in the context of museum learning will shape student activity, and I do need to make sure that I also look at how the tablet computer possibly constrains equally as it may empower the students creating personalized narratives. "*In this way digital storytelling for us represents developments in the way humans relate to each other and their surroundings*." (Erstad & Wertsch, 2008:37). The issue then becomes to be aware of how these new cultural tools change the use of narratives in fundamental ways. Therefore, it is an relevance to look at the changes in the use of narratives with digital storytelling in the context of my observations in the museum.

Digital Storytelling entails the properties of an agentic structure. However, the educators and facilitator is of great importance to what extent this genre in fact does facilitate for the student's development of agency. How the assignment is constructed will influence this aspect. In an educational context the assignment connected to the production of digital stories, I argue will structurally stand over against digital storytelling as a genre. Therefore, it is important not to uncritically adopt this genre for educational purposes as means for developing the adolescences agency. Why I argue that the assignment would structurally stand over against digital storytelling, is related to the evaluative nature of the educational context. An assignment may remove the free-choice aspect. The assignment structures the student's actions and the genre of digital storytelling enables for agentic actions origin from the actor's interests, culture and personal experiences. In this pilot study however, the assignment was not intended to be given marks or be graded. Although we do not know what

the teachers commenced to in school after the visit to the museum. The assignment in the museum facilitate for what Brown (2000) refers to as being one owns librarian also related to the ongoing debate on literacy. The students read archive text and images, they are photographing hence collecting their own imagery and they also have the opportunities to collect from their own personal experiences from their own lives.

3.3 Summary

Discussion made and presented in this chapter I see as important to comprehend in order to understand the implications in promoting democratic and participatory statements in educational practices. Empowering people with agentive possibilities, choice and freedom, is not necessarily possible before acknowledging the tensions between agent and structure. Embracing the concept of agency in educational purposes implies both possibilities and challenges. The practice of digital storytelling with tablet computers in the museum theoretically has the potential to foster agency and develop the agentive learner. One way I seek to analyze agency is to provide examples from the observation videos where I look at the students understanding or sense of choice and choice provided by the Fast Forward program. I have seen in the videos how the students often seek approval by the museum educator related to their ideas and actions. Another way I look for agency is to illustrate with examples where the museum educators instruct the students and facilitate for student choice. Also examples where I argue negotiation are happening, i.e. students moving beyond instructions. I see the importance to look at how digital media is used in relation to choice and control which is related to the concept of agency and the concept of free-choice learning in the museum.

I will now move on to present the case of Fast Forward in chapter 4.

4 The Fast Forward pilot

This chapter is the description of the Fast Forward pilot. I will present the physical organisation of the pilot in the museum, the related learning design, learning recourses and the assignment.

4.1 Case Description

The museum with input from the project-group independently invited eight grade students from random schools to participate in a pilot study and in March 2012 the first day of testing took place. Frameworks for implementing the pilot study were developed by the museum educators which was further developed after the first and second day of the pilot. Three pilot tests were initiated in the spring of 2012.

The museum provides a room titled The Robot Centre which is for educational purposes, and the first day of the pilot the visit was initiated in this room but after feedback the educators changed the order of things when commencing day 2 of the pilot. Response given by me and my supervisor evolved around the issues of an educational practice which unfolds the properties of learning in the museum which is related to a notion of object-centred meaning making. In practice this means that a larger portion of the time spent in the museum should take place in the exhibition room among the museum artefacts. Therefore, pilot day 2 began in the exhibition room commencing a mini-tour supported by a dialog about the nature of museum artefacts. The intention was to facilitate the students with an acknowledgment of the historical, contemporary and personal stories which is inherently connected to the objects in the museum, and how these connects to the student's personal lives. It is important that the museum does not marginalize it self as an expert in an attempt to become visible as an attractive institution of cultural knowledge. Therefore, highlighting the importance to make sure that the learning activities in the museum does not mimic the traditional classroom learning activities in school. One of the main objectives in museum learning is meaning making with objects, hence the need to make sure that the distinctive nature and attributes within the museum is maintained.

4.1.1 Learning Design

After participating in a two day workshop on digital storytelling, the museum educators was taken the interest to test out this genre as part of a visit to the museum. As this was a pilot study the learning design was under development trough out the project. The hours available for the students and the educators was set to four (with a lunch break in the middle) and the organization of the learning activities to a certain extent fixed, although only seen as a guide and something for the students to relate to when organizing their activities. Teachers at the visiting schools were asked to divide in groups of 2-3 students on beforehand of the visit. The museum provided the tablet computers (iPad) and the groups was facilitated with one each, and also a studio for sound recording was provided for producing voice over.

Figure 1:

The museum visit was planned in four phases: 1) a short dialogic introduction in the exhibition space with a focus on the chosen (by the museum educators) exhibited subjects, followed up with an introduction to the assignment and the related learning materials, 2) approximately 1,5 hours for the students collecting data, 3) approximately 1,5 hours where the students edit data, write a storyline, record the voice over and at the end edit their final digital story, 4) 30 minutes presentation of the finished digital stories on a big screen in The Robot Centre.

4.1.2 The Assignment

The museum chose four main themes which related to specific artefacts in the exhibition (here presented in random order): 1) The mobile phone's history, 2) Norway's first automobile, 3) Norway's oldest automatic telephone central, 4) The Caravelle Yet aircraft.

Figure 2:

The groups of 2-3 students could choose one of these four main themes to use as subject matter and trigger for the production of their digital story. The task was to produce a digital story by using archive material, by using own imagery from photography with the tablet computer, writing a storyline which was recorded and used as voice over, and editing the final story with iMovie in the tablet computer. The students were motivated to use their own personal experiences as data for their stories, consequently they could essentially tell any kind of story as long as it some how was related the chosen theme. The length of the digital story was set to approximately 1-3 minutes.

4.1.3 Learning recourses

Each of the four main themes had an accompanying information booklet which contained archive images (both illustrations from advertising posters and photographs), facts about the specific exhibited object, and news articles related to the object and/or historical debate

connected to the theme which indirectly connects back to the objects genre. One example relating to the first automobile is an article about a public resistance towards the arrival of the automobile into the Norwegian society. There were also additional images stored in the tablet computer for student use. The tablet computer facilitates for browsing the internet which also was an alternative for the student's data collection. However, there was only internet availability in the Robot Centre, consequently there was no internet connection in the exhibition space. The museum also provided pen and paper for use when writing a storyline.

5 Methodological Discussions

In this chapter I will discuss methodological issues and describe the process of my analysis in detail. I begin the chapter with the background for my involvement in the Fast Forward project and my communication with the museum. Ethical issues will also be discussed. Further I present my research methods and finally I present the process of coding the data material for presentation.

5.1 Background

The Fast Forward pilot was an initiative from the Norwegian Museum of Science and Technology and the Norwegian Museum of Telecommunication with funds from the Norwegian Council of Culture. Researchers from The University of Oslo were invited to the project group to participate in the planning of the pilot test, and in this way were indirectly influencing the pilot program. However, this was the museums' project and the university only invited as experts of research on pilot testing. There were performed three pilot tests spring 2012. My involvement with this project was initiated after I contacted whom who became my supervisor that invited master students to participate and use the pilot-study at the Norwegian Museum of Science and Technology as empirical material for their master thesis. I attended meetings and discussions at the museum before the pilot was launched. As I am a certified teacher I was able to participate in discussing issues related to the creation of the assignment in Fast Forward. In addition I am educated as an visual artist and so I have experiences related to making and attending exhibitions, and thus experiences related to issues on what and how to curate an exhibition. Anyhow, my background also facilitated challenges. My background shapes my preunderstanding and I might take no notice of phenomenon occurring in the context. On several occasions my supervisor have helped me to be more objective and highlighting radically aspects of the Fast Forward which was for me obvious. I.e. the practice of education in visual arts is highly enquiry based as the activities in Fast Forward. Our background will always be with us into the research context and it is therefore important that we attempt to leave this behind when moving into a project. The researcher's background, interests, choice and interpretations are always influencing the

research outcome (Kvernbekk, 2002), therefore the results are an outcome of the research process as much as the context which the research are based on.

During the process I have had regularly contact with the museum educators when they have wanted to discuss issues related to the Fast Forward project. The museum has in several occasions presented their experiences with this project on seminars and they wanted me to communicate to them my findings to be used in their presentations. In addition evaluations were made after each pilot test, and the museum educators gave me feedback on that they made changes to the pilot after suggestions from me. Obviously this was an inspiring aspect. However, in the aftermaths one can argue that in this way I have been to close to the research context, and thus influencing the result. Anyhow, I have been giving no instructions on how to use the data material, and I have been conscious not to evaluate the quality of the Fast Forward as a pedagogical program. My mission has been to describe and not to evaluate. Evaluations in my thesis is strictly attempted to be in relation to my chosen theories.

5.2 Research Methods

I needed an extensive insight in this area of field to understand how to grasp the complexity of this process methodologically. Initially I read up on Grounded Theory to see if its inductive approach to empirical data would be appropriative for my enquiries and also Interaction Analysis is a related method which I wanted to develop an understanding of. Grounded Theory is a highly inductive approach where the empirical data directs the inquiry and the creation of categories which leads to the creation of a theory (Alvesson & Sköldberg, 2009). How I understand Alvesson & Skölberg (2009), Grounded Theory implies the creation of a theory, and that theory is tested in more than one project to over time manifests itself as a Grounded Theory. In this relation I would simply argue that I have used a Grounded Theory approach, because I have not set out to create a theory in this respect. This approach are by many researchers seen as the only true method in qualitative methodology, but a disadvantage with this method is that one simple give new names to old concepts. (Alvesson & Sköldberg, 2009). The idea is to begin with empirical data and create categories through the procedure of coding (2009). The creation of categories by coding my empirical data is thus how I relate my work to the grounded theory as an approach. Analysis and findings are always to be governed

by the empirical data and therefore I have continuously moved back to look at my observation videos to make sure the text production is as close to the empirical reality as possible. This approach is also related to video based Interaction Analysis with origin from ethnography, sociology, ethnomethodology and conversation analysis (Jordan & Henderson, 1995).

5.2.1 Interaction Analysis and Video Observation

My task was not to evaluate the project of Fast Forward but inform and describe what occurred during the pilot tests. I intended to look at different aspects of the process (which I chose) to uncover. As for example: How the students solve collaboration, where they collect information from, the museum educators, other students, teachers, internet, handout booklets, experience from previous visits, etc. How the tasks in the museum was understood, and operationalized, how students use the museum space, how students interact with the artefacts. Do I comment on the student-role? Teacher - should the teacher be more involved so that they feel ownership to the visit? These were questions I asked myself to discuss and anyhow comment on since it is relevant to account for my selections in the process of analysis in this chapter on methodology. After reading literature which discuss the notion of technology and artefacts as designing and structuring human action (Wertsch, 1998, Jordan & Henderson, 1995) I found the interest in analyzing how the tablet computer and the assignment of producing digital stories in the museum structures the students action. The use of tablet computer (new technology) and also the genre of digital storytelling (a new development in the practice of museum learning) is an innovative initiative by the museum educators, hence the need for research and the creation of new knowledge and acknowledgment. Therefore, it seemed constructive to look at how the technology and the genre structure the student's actions, also monitoring their meaning making process. However, the assignment constructed and put forward by the educators would seem as the main source for shaping and structuring the student's actions, although tablet computer technologies facilitate for new ways of actions. Furthermore, the student's own contribution and agentic actions also need to be taken into consideration, hence I came to the idea of a dimension to the categories of analysis namely that of the student's personal contribution in the making of their digital stories I.e. how the project enables the participant to incorporate their own personal experiences and prior knowledge into the production process. The students personal contribution is linked to

fostering the agentive learner (Erstad & Silseth, 2008). Conjoint with how the technology and genre structure actions, looking at agency and agentic actions I argue will give a comprehensive understanding of and how this educational program facilitates for learning experiences and collaboration. The technology perhaps structures the assignment's creators and facilitators more than the agent's actions structure the process.

Summing up: Watching student actions in the observation videos made me interested in the relation between structure and agents. I observed how the students sought approval and how the museum educators replied and instructed accordingly. Hence, theories of agency were incorporated into my analysis.

For reasons argued above I saw interaction analysis by using video observation as an interesting field to inquire knowledge in relation to my work. Interaction Analysis seek to investigating human interactions with artefacts, technologies and with human beings interacting with each other (Jordan & Henderson, 1995). Reading this literature gave me knowledge on how one can solve the issues of presentation of empirical investigations, i.e. various ways of conceptualize video data (Derry et al., 2010). *"Any video corpus captures many events. Selection determines which events are brought into focus for deeper analysis."* (Derry et al., 2010:7). This way my interests as a researcher will determine which events I chose for deeper analysis (2010). Choosing the method of video observation was made because of the videos' quality to replay, and it is a method with growing interest in the learning science Derry et al., 2007). Having video as data material one are able to frequently go back and verify ones own assumptions of the occurring events. We had no separate microphones attached to the participants, and so the sound quality was not that great in m y video material. Sometimes it is difficult to get a good impression of the conversations between the students, however I could play the videos repeatedly until I was curtain that I knew what was said. Parts of the talk between the students are not hearable, and so the video recordings could have increased quality if mounted microphones.

5.2.2 Selections of Participants

The museum executed three pilot tests, and on the first observation day my supervisor operated the camera for our production of observation videos. The idea was that I could learn

by observing an experienced researcher doing empirical observations, and this way I was also able to obtain a comprehensive overview of the context and simultaneously writing field notes based on observations of actions that occurred during the pilot test. There were three pilot tests which were performed spring 2012 and I observed all three, but chose early to only incorporate the two first tests in my thesis. In the project group researchers from the University of Oslo advised the museum not to use partnership schools. I.e. schools the museum previous had been in close partnership with and where they knew the teachers. This was a pilot test/study and using schools where they were acquaintance with the teachers may affect the outcome. Most likely the teachers and the students then would have had an increased motivation and interest in the museum activities. The teacher in pilot test three was an earlier employee at the museum. When I also lost my video recording from after lunch pilot test three the choice was evident. In addition the pilot test three was with students of media and communication at an upper secondary school, and so they were familiar with producing media content more than the representative average visitor to the museum.

We chose to focus the video recording on the students hands operating the tablet computer, and sound was also recorded with the camera. This choice of selection implies that something else is deselected, but selections are also related to ethical issues. When conducting video research one needs to get permission from the participants. If the participants are underage one also need authorization from the parents (Elliot, Hulme, Lewin, Lowden, & Menter, 2011). In addition a notification form describing the research project was sent to the NSD (Norwegian Social Sciences Data Services Limited). This notification form was written in collaboration with my supervisor. I had planned to do interviews, both group and individual interviews. However, analyzing video recording is a time consuming practice and so I in the end decided not to conduct interviews. Selection of participating schools was carried out by the museum, and the pilot design in general was created by the museum. The students observed were chosen when arriving in the museum. We explained in detail what was going to happen and that it was only the researchers that had the availability of the videos, and that it was voluntary to be observed. Fortunately on all the three pilot tests we got voluntaries with parental approval. The observations were done in my second semester of the master degree and so I left this project to commence the transcriptions in August 2012.

5.2.3 Researcher Effect

Another issue I recognized during the observation sessions was my own involvement as an observer. The issue of camera or researcher effect implies that the one who is observed change or shape their behaviour when they are videotaped (Barron, 2007). Several times in the beginning the students directed question to me. Some of them I answered but mainly I discarded these questions with the intention not to influence the process. However, I can not discard the fact that I did influence the process when I followed and video recorded the students during the museum visit. I also got the feeling that the students under observation to some extent was neglected by their teachers and the museum educators, because I was seen as an adult who instructed, answered questions and monitored the time left to completion. At the end of pilot test two I see my intervention to great when I anticipated that the students were running out of time. Consequently, I instructed the students to some extent when they recorded the voiceover. Nor the teacher or the museum educators were nearby when they were occupied organizing the final stage in the classroom. I do think that this is an example of researcher inventions, but it is impossible to know if the students would have been more closely followed up by the educators if I was not in the present. Looking back I should have communicated to the students on forehand that all questions should be directed to the teachers or the museum educators, and that they should attempt to disregard me as much as possible. Another aspect which is important to mention is that the students efforts most likely was increased, or at least influenced in some way, when they have a researcher monitoring their actions.

5.3 Coding and Analysis

Empirical processes have only relevance in relation to a research question (Lund, 2002) and the notion of an empirical reality is constructed by the researchers interpretations (Alvesson & Sköldberg, 2009). I experienced this issue when after transcribing my observation data (observation video and field notes) and started to get an overview of the data material I had collected. One can theoretically transcribe and communicate all what is empirical observable in the observation videos, however, in the context of research the relevance in such an all in-approach is questionable. My experience was that to communicate and to theorize data I

needed to highlight and categorize the observable phenomena. After an agreement with the museum (August 2012) to give them a response related to my findings in the data material the problematic characteristics of case presentation emerged. Courses in methodology in relation to my master degree studies at the University in Oslo facilitated me for this acknowledgment, in addition to literature on the subject. Consequently, the museum's interest in my feedback that early in the analyzing process, contributed to accelerating the progress of presenting my work. I started to code my video transcriptions with what I called theme-filters (same as categories), which was further developed to categories of actions in the time after the meeting at the museum. After having met the museum educators giving them the preliminary findings I continued the development of theme-filters towards Categories of Actions as defined later in this chapter. Here is a brief description of this process.

Theme-filter as presented to the museum educators:

1. Collecting Information
   - Internet
   - Archive handout
   - Personal experiences
   - Fellow students

2. Interactions with artefacts and the exhibition

3. Production of the digital story

4. Time spent in the exhibition space

I coded these theme-filters with colour pens in the video transcriptions which made me able to communicate and present actions made by the students I had focused on and present these in an organized manner to the museum educators. This lead on to fruitful discussions and I also presented instructions and guiding by the educators which I had seen in the observation videos. This way we could help each other with reflections and acknowledgment.

The next step was to develop the categories. I made tables where I wrote in the transcription with a time line and divided in three categories of actions, and in addition columns with descriptive codes and interpretative codes.

Time	Collecting		Interacting		Production	
000	Descriptive code	Interpretative code	Descriptive code	Interpretative code	Descriptive code	Interpretative code
07: «Han som skulle følge oss til flyet gikk.» «Nei, vi skulle gå selv.» 0.46: «Blir nervøs av å holde i en I-pad.» 0.55: «Hva om du mister den?» « Det må ikke skje!» «Jeg blir driti ut for det.» 1.32: På veien opp til flyet snakker de sammen og en av jentene forteller at faren har en stor koffert. Slik jeg forstår det snakker de om mobiltelefonens utvikling. Vekt, størrelse osv. 2.11: Snakker de om hva de andre gruppene har valgt av tema..? 2.55: Holder I-pad opp slik at flyet kommer til syne på skjermen. « Kan vi ta bilde nå?» Svarer seg selv: « Nei, vi kan gjøre det etterpå.» 3.03: «Det er stort (flyet), det er vanskelig å få kule bilder.» Dette	They do not have archive texts with them in the exhibition and do not try to go online.	They do not seem to at this stage to require any in formation other than trough photographing the artefact. For them the Ipad only has the function of a camera all though the big size of the viewfinder gives opportunities for collaboration.	Holding the Ipad so that the airplane is visible on the screen.	Inductive and reflective approach.		

Figure 3:

The descriptive codes attempts to describe non-verbal activity and the interpretative codes a reminder for myself that these are my subjective observation and arguments. These tables I only used as a guideline, and as a video table of content and was produced early on in the process. When I am referring quotes and non-verbal activity in the text I have used the actual videos as reference point. When new developments in the process I have always gone back to watch the videos to verify or find new phenomenon. I wanted the final thesis to be as close to the empirical context as possible and so I have continuously used the observation videos when analyzing and not the transcriptions. Anyhow, when I started to produce the text for the categories of action, the descriptive and interpretative codes were the origin.

I have until now in this chapter discussed methodological issues and described the process of coding and analysis. I have refined these categories all the way to end. I have moved back and forth between the data material, reading theory and relevant research in the field. Therefore also the analysis as presented in chapter six has been an ongoing process where it was formed and shaped all the way to the completion of the thesis.

5.4 Reliability and Validity

In qualitative research questions relating to reliability, validity and generalization has by some been neglected (Kvale, Brinkmann, & Anderssen, 2009). Validity has to do with if the chosen method in reality observes the phenomenon the research is intended to observe, and reliability connected to questions regarding if an independent researcher would arrive at the same interpretations of the same data material (Fangen, 2004). Discussions related to generalization in qualitative research I have no intention to participate in with my work. Doing qualitative research one is almost never intended to generalize the findings, but the intention is to study phenomenon which occur in the specific context. With my chosen literature on interaction analysis, video observation analysis, museum learning and human agency, I have attempted to validate if my method does answers the questions as proposed by the main objectives for my research work.

As I have video recordings as data material I was able to conduct repeatedly viewings of interactional activity in the Fast Forward pilot recorded on video. Having observation video for analysis facilitates me to examine my interpretations making sure my assumptions resembles what actually is on the video recording and that they are not what I think I saw (Jordan & Henderson, 1995). It is for the same reason I have relied on the observation videos as the final authority (1995) and not the transcriptions. To support the significance of our work doing video analysis one can participate in research communities where one can present events from our video corpus and get other researchers to validate our interpretations (Derry et al., 2010; Jordan & Henderson, 1995; Lehn & Heath, 2007). As we wrote in the application to NSD that my researcher and I were the only participants in the project group I could not carry out this exercise of showing the videos to others. However, I have been working closely with my supervisor which also wrote a paper with findings of my work to be presented at a conference in Iceland (Stuedahl & Kise, 2013), so we have in collaboration to some extend ensured the reliability of my finings. Nevertheless, the reliability and validity of my work have potential to be of better quality, when I have not participated and presented in workshops with independent participating students or researchers. Furthermore, my video transcriptions also have potential to be of greater detail and in more resemblance of the data in the video recording. My transcription was only created for my own use, without the knowledge that they also could be in use for other researchers to verify the reliability of my claims and interpretations. These were acknowledgments I made late in the research process. By using

sign systems of human uttering one has the ability to create transcripts where independent readers may comprehend the empirical reality. Anyhow, I have illustrated examples of non-verbal activity with photographs in text so that the reader to some extent has the ability to make their own assumptions of the context which has been researched.

5.5 Categories of Actions

After having obtained an overview of the field of museum learning and museum observation following the transcription of the empirical data three categories of actions were recognized: Social interactions and interactions with objects, Collecting and Production. The three categories which incorporate the analysis of the observation videos sort the empirical data. If not empirically separable, they aim to theoretically distinguish these actions. The claim is that students interaction with each other, with the archive material (both the written word and imagery), the exhibition room, the exhibits and the museum educators, represents collecting activities where they are making choices about information and relevant content to be used in the production of their digital story based on their personal experiences and prior knowledge. I.e. in dialog and interactions with the archive material, the exhibited artefacts conjoint with the student's experiences, interests and prior knowledge provide different sources to collect information from and therefore opportunities to collaboratively author, mix and combine in their own personal manner. Internet is also a source which is available in some parts of the museum. The concept of agency will be added to the analysis to frame the students activities of social interactions, collecting and production as capacities to build own interpretations related to the museum content. Meaning I will seek out to establish to which extent this pedagogical program facilitates for the students as agentive learners, hence the development of the students agency, and furthermore, if the student's actions empirically illustrate forms of agentic actions as described in the theory chapter on agency. However, these categories seek to theoretically illustrate the action that occurred in the Fast Forward pilot.

5.5.1 Interactions Definition

The category *Interactions* attempts to describe how the assignment by using an Tablet computer outlines and facilitates student interactions with and within the museum. Possibilities and constrains trough agency are key concepts to be evaluated. The use of an tablet computer in this project is a prerequisite for student activity and thus the focus on interactivity will mostly be identified trough the handling of the technology for the aims of photography, although other actions are also relevant as explained above. Interactions is here defined as dialog, discussion, and collaboration although sometimes in a more symbolic and abstract fashion. Thus, dialog and collaboration are highly connected to interactional aspects, as interactions with artefact, archive written text and images on tablet computer and internet, interactions with the museum space, as well as the exhibition space. In this manner I seek to establish an understanding of the interactions with the archive, i.e. how they interact with the archive trough the technology but also more traditional non-technological interaction with artefacts and trough reading archive text. Consequently Interactions summarizes the process of the dialogues and discussions and collaborations the visitors has with the archival material, museum space, exhibition space, museum educators and the exhibit in question. The category Interactions build a metalevel to the more specific and directed activities of collecting and production and although they empirically may appear similar, the intention is to analytically separate these categories of actions. In interactions the students collect the content to be edited to their final digital story. The categories of actions are highly connected to the free-choice aspects of a museum visit, hence also to agentive features.

5.5.2 Collecting Definition

Keywords: Choices, interpretations, personal experiences, meaning making

The category Collecting Information includes the students collecting the content and narrative to their digital story that to a certain extent forms the final narrative presented in the digital story as a product of the collection process illustrated under this category. Collecting Information may be misleading since it also concludes to include the students own experiences and prior knowledge related to their interpretations of and choices related to which of the archive information facilitated by the museum educators and their pedagogical

program to include in the digital story. Therefore Collecting seems to incorporate the visitor's interpretation and hence their meaning making as motives for activities of gathering relevant information. By this I mean that the students understanding of information in the museum exhibition context is open for interpretation. Anyway experience and prior knowledge jointly with the personal interpretation of the collected information becomes information or new knowledge when communicated and incorporated into digital storytelling. In this way the students collect from the information they have available, interprets and incorporates it to their prior knowledge and their own personal experience. This is their meaning making process. Conversations in the museum with museum educators teachers and classmates would also classify for this category and so is going online and browsing the internet. The Archive material included incorporates both the written word and imagery and includes photography and illustrations. It is therefore interesting to allocate insight in how the students use the different information sources available when the museum so radically changes the conditions for being a visitor to the museum. As opposed to strictly curated exhibitions does the museum in the Fast Forward pilot provide a big amount of information, where the students may collect and choose information on an authoritative and a personal way. In fact the tablet computer the assignment and working in pair facilitates for observing and analyzing the students collecting and interpretation process and therefore possibilities to monitor their meaning making process.

5.5.3 Production Definition

Keywords: Text production, sound recording, editing process.

The production of digital stories in the museum incorporates several distinctive actions hence the descriptions of actions under the three categories defined overlaps when these actions take place simultaneously. Aspects of being a museum visitor and at the same time a producer of a digital story both play a part side by side therefore these categories identified in the observation video sometimes include similar actions but most importantly they include inequalities. Although the assignment of the day is to produce a digital story the category *Production* would seek to incorporate the actual events related to narrative editing and sound recording. This means that even though the students work with the tablet computer camera unquestionably build up a personally narrative, *Production* attempts to identify conversation

and actions directly related to a story line, sound recording, editing written text and editing on the tablet computer.

I have now described three categories of actions; social interactions with peers and museum objects, collecting and production which I argue is a constructive illustration of the students meaning making process in Fast Forward. Trough interactions the students collect information which is then edited to a digital story. The analysis in chapter six is not divided into these categories, however I see the importance to explain in detail when I define actions as categories and use these as explicit terms in the analysis. In addition I have in this chapter presented my methodological arguments and the process of coding my empirical data.

In chapter 6 I will start my analysis of my chosen events from the observation videos.

6 Analysis and Discussion of Findings

This chapter is presented as an empirical narrative. First I present issues related to presentations of my empirical data before moving to an introductory presentation of the empirical context pilot test one. The nest step is a deeper analysis of the latter and further introductory descriptions and a deeper analysis of pilot test two. Furthermore, I include analysis and discussions of selected events from both pilot test one and two.

6.1 Empirical Descriptions

The production of digital stories with tablet computers in the museum is a new intervention and so all interactions are of equal interests and importance (Derry et al, 2010), to understand the influence of technology to students learning activities in the museum. The observation video footage recorded during the two pilot-testing that build the empirical background of this thesis contains a vast amount of information. Therefore, selection strategies are needed to comprehend the overwhelming process of choosing what to select for presentation and analysis of data (Derry et al., 2010).

Hence I have build up the empirical description layer upon layer to comprehend the overwhelming amount of data detail. The first layer is layered as *thin* descriptions of the sequent's which is documented in the videos. Thin descriptions, I use in contrast to *thick* (Geertz 1973, ref. in Derry et al., 2010), where the intention is to present the research in a narrative where the empirical complexity is made understandable, so that the reader may understand the context in which the research took place. The second layer of my presentation I will describe as *thick*. Thick implies descriptions that are rich with details. This way the *thin* descriptions function as an introductory part to the context and the *thick* descriptions has the intention to complement *thin*, by presenting the research observations as a story which the reader may comprehend.

The *thick* descriptions are the paragraph where I seek to answer the overall research question: *In what way does the student's use of tablet computer technologies support their agentive*

learning in the museum? This layer will be presented in "play by play" where interpretations of episodes are presented sequentially to show how these episodes are developing the context (Derry et al., 2010) of the production of digital stories in Fast Forward. When presenting the empirical data in episodes which follow one another in sequence I describe how the context develops in time. In the third layer I present further examples as events (chapter 7) as chunks of time where interactions identified in the videos is interpreted as events having beginnings and endings (Jordan and Henderson, 1994). These events undergo a deep analysis to answer the sub-research question. Examples presented in this chapter are the foundation for the discussion. Therefore the events in contrast to episodes do not describe the context as a narrative, but mainly they describe chunks of time which I argue have beginnings and endings, where actions occur which are relevant for my analysis.

Focus groups for the observations are 8th grade students with two girls observed on day one and two boys observed on day two. To secure the students anonymity they are given fictional names: Sophia and Anna for the girls and Mark and Jacob for the boys.

6.2 Thin Description Pilot Test Day 1

What follows is a brief description of the context and the actions made by the students in pilot test day one. This day I followed two eight grade students which I have named Anna and Sophia.

In the Robot Centre the museum visit is initiated with questions and a dialog between the museum educators and the students about the role of the museum and what is unique in a museum. The Robot Centre (figure 4) is a room with chairs and big round tables and a big screen for video display which I continuously also refer to as the classroom because of its similarities. The museum educators continue to inform and instruct regarding the use of software (iMovie), the assignment and the four different themes or artefacts the students can choose from to use as trigger, introducing the media content material for their digital story.

Figure 4:

After some planning and discussing, the students follow one of the museum educator two floors up to the exhibition room. The exhibition room is a large hall containing several permanent exhibitions with authentic objects and the big airplane which Sophia and Anna had chosen as their theme.

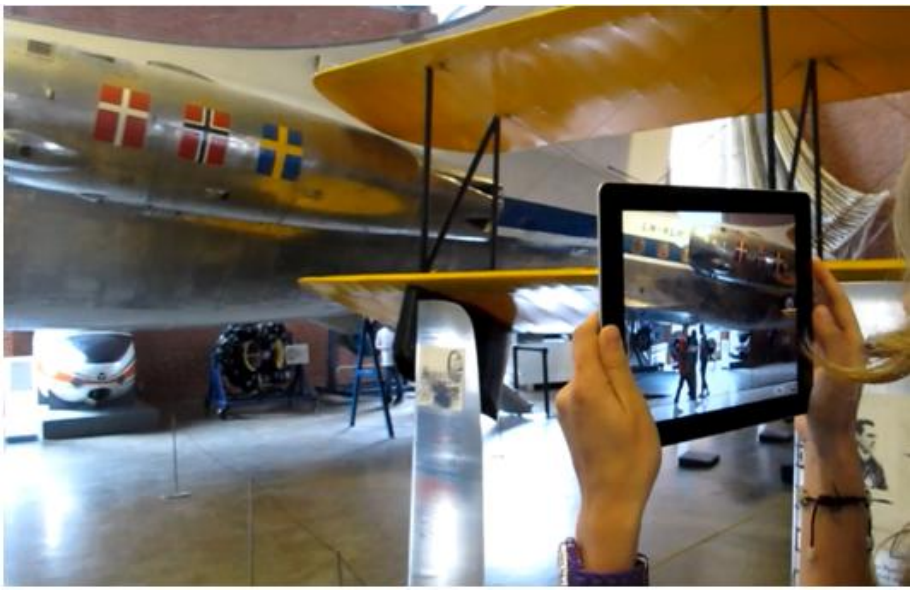

Figure 5:

When arriving in the exhibition the museum educator gathers the students and trough a monolog offers instructions on photography before leaving the students to experience the exhibition by themselves. After walking around browsing the airplane exhibition which the group of students in focus had chosen as their subject, they start fumbling around with the tablet computer and after finding the right focus for the photography process the students

starts to discuss what parts of the airplane which might be relevant for them to photograph. Close to the rear end of the airplane in the exhibition there is a training simulator (similar to the one in the airplane), along the right side of the body of the aircraft there is located airplane engines, and under the airplane luggage trolleys as used on airports. After browsing and getting a good overview of the exhibition the two girls stop at the training simulator. Sophia wants to read a text plaque and photographs the cockpit hence collecting material for their digital story.

The airplane is facilitated with the original stairway to walk up and move around inside but it is closed down with a barrier on top of the stairway and for the students that communicates a ban for stepping on the stairway. Several times during the interaction session our two students discusses this challenge when they have a desire to photograph the inside of the airplane. After a while Anna finds courage to walk the stairs to find that the light conditions are too challenging to get good quality images.

Now that this obstacle is overcome, follows a sequence with photography of the wheels and the engine and discussions of doing close-up photography which the museum educator gave them ideas for during his photography instructions (discussed in 6.4.1.). This leads onto a summary and reflection of the images they convey in the tablet computer so far and new discussions on motives for interesting and amusing imagery. The session with photography under the airplane photographing the luggage carrier ends with Anna photographing Sophia under the airplane. Then they move back to the training simulator again reading on the text plaque resulting in new ideas for imagery. The students end their interactions in the exhibition after eighteen minutes.

When our group arrives back in the classroom the museum educator advice the students to put the tablet computer aside and start the text production and as a result they start reading trough the archive text and writing down keywords related to the chosen assignment. Before lunch and after intense work writing the storyline, one of the museum educators read the written text and approves it after requests set forward by the students. This is followed by a thirty minute lunch break.

The session after the lunch break is initiated with instructions about the process of sound recording and information about the length of the digital story and other related details. The two students in observation continue working on the storyline and divide up the lines to be

read when recording voiceover. They chose to await editing the images until after the sound recording and when sound recording facilities are ready they leave the room to record their story. After sound recording they edit the images with the intention to make them compatible with the sound recording. The four hour visit to the museum ends with watching all the groups finished digital story productions followed by questions and reflections related to the digital stories and students experiences in the museum.

6.2.1 The Students Final Digital Story Pilot Test Day 1

Here is a brief summery of Anna and Sophia's finished digital story to make the analysis easer understandable:

Sophia and Anna's digital story begins with an archive image of the airplane in air and Sophia's voice telling about when the airplane was first taken into service and the total hours of flight before it was taken out of service again. Further on she explain how Turid Widerøe was the first female pilot flying with SAS (Scandinavian Airlines), also adding a quote from Turid about here experience when flying. During this talk images from the archive is showing. Now Sophia and Anna's own photos are appearing on the screen while Sophia's voice explain what they associate with flying and that airplane today are much bigger than this one. Next Anna's voice continue to narrate the story now with archive images, talking about ear pressure and how passengers in the old days dressed nice but today one dresses more comfortable. The digital story end with images of when the airplane was transported to the museum and Anna's voice inform us that the plane was given to the museum as a gift by SAS.

In the next paragraph I seek to provide thick description, to obtain an understanding on how the use of a tablet computer, with the assignment given as a guideline, shapes the interactional structures in the museum context. The concept of agency is not dealt with in a detailed manner in this section, but will be addressed in more detail in chapter seven. I have defined and outlined how I use the idea of interactions as analytical framework (presented in 5.3.1 and 5.3.2); consequently I will not necessarily in detail elaborate on, in the episodes, what or why some actions are seen as interactions and some collecting and production activities. Dividing

the empirical data into episodes in “play by play” gives me an opportunity to show how the process happens as a sequentially narrative.

6.2.2 Episode 1 - New Ways of Interactional Collaboration in the Museum Exhibition

In this episode I will present examples which I argue illustrates how the Fast Forward pilot and students interacting with tablet computers changes the foundation of being a visitor to the museum. The students are given choices and possibilities to incorporate their youth culture photography practises and are given the authority and accountability to innovate the roles between the museum educator and the visitor.

The photography instruction session which commenced when arriving in the exhibition implies new roles for the museum educator and the visitors. Rather than instruct the visitor about the museums attitude to possible interesting visual aspect about the museum artifact, the educator instruct them on how to conclude themselves trough their selections of desirable imagery. Here I set forward arguments that the students contribute and incorporate the traditional role of the museum to find alternative ways to communicate the museum archive. Traditionally, museum visitors were guided trough the museum room with no choice of action. However, guiding centred learning is still practiced in many museums today (Bamberger & Tal, 2007).

It would seem appropriate to assert a claim that the observation video shows the students need to adjust to this particular context of photography. This in the meaning of that in their everyday life do youths photography practices evolve around issues relating to self representation and youth culture primarily trough social media. In the museum context this practice is given a new form, and student skills and knowledge on photography as representation of “reality” definitely will influence the process.

After the photography instruction session Sophia and Anna walk away in distance to be able to get as much of the airplane in the photo. When Sophia turns around to take a photo Anna utters that she does not want to be in the photo, although there had been no discussion or indications that they had planned to incorporate themselves in the photos.

> Anna: I don’t think I want to be in the photo, Sophia.

For this reason I came to the argument that if the students have no experience in using photography as documentation in this way, they need to adjust to the context which they are photographing in. Photography has other possibilities than self representation which is widespread in the youth culture. In this relation the Fast Forward program provides the students with an insight into photography presented as a narrative and possibilities to combine photography as self representation and photography as representing a theme or a topic. In relation to youth practices and self representation, I will follow up with another example on this issue. After walking back and forth in the exhibition the girls seems to have run out of ideas for imagery and Anna instruct Sophia to position herself under the airplane so that she can photograph her.

> Anna: Now I want to take photos, because he said we could. And then you can take a photo of me. You can place yourself under the plane.

There are no reflections related to if and how they think to incorporate the image of Sophia in the story. It mainly seems that they are documenting their personal museum experience, which, as I have argued, coincides with youth practice and self-representation and personal interests. However, they do put forward ideas to incorporate this image in the digital story during the editing process.

Along with these dialogs another interesting interaction phenomenon occurs. Sophia is holding the tablet computer with outstretched arms, and when Anna positions herself behind Sophia she can easily watch how Sophia is positioning the airplane on the tablet computer screen (figure 6).

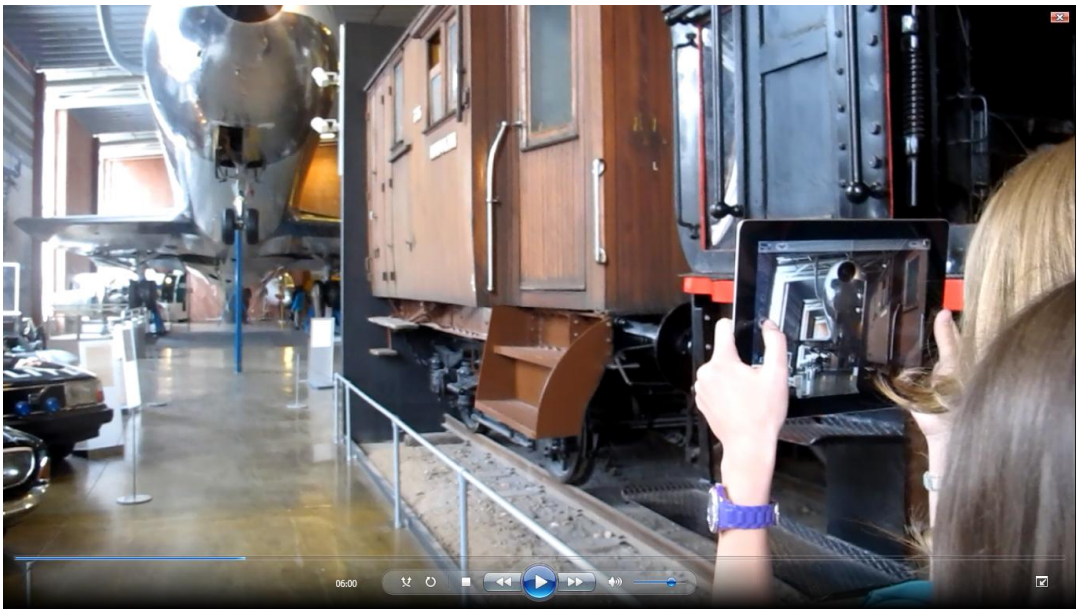

Figure 6:

When photographing, Sophia and Anna in collaboration look at the tablet computer screen discussing perspectives of the images. The relatively big screen gives them good opportunities for collaboration, when they both can get a good look at the screen at the same time. Tablet computer technologies this way scaffolds cooperation. In first instance one might argue that the students should be able to photograph simultaneously with one camera each, however the video observation show that the big screen in fact encourages for a dialog between the students:

Anna who was walking a few step behind, catches up with Sophia:

> Anna: Let me participate.
> Sophia: Come over here then.

The tablet computer screen has the function of a viewfinder when photographing as a viewfinder function on any digital camera. One student holding the Tablet computer with both hands, the other student may even help guide the placement of the object in the viewfinder and can easily see the result even though not holding the tablet computer herself. This finding is one aspect which the educators had not foreseen when implementing this pilot.

After adjusting to the context after arrival in the exhibition room the students position the tablet computer so that the airplane is visible on the screen and find that the size of it complicates representation of this feature with photography. The process of photography invites the students to investigate the object's size and aesthetics in a subjective manner rather

than being led to an objective perceptive. This leads to an interaction with the artefacts that commence an inductive and reflective approach. I argue that the photography process provokes a deeper reflection of the museum artefact's design and aesthetics than traditional interaction without a camera. On the other hand, reflections on the object's properties or abilities might at the same time be restricted. Anyhow, this limitation might be brought up to date when producing the storyline. I will discuss this in detail below.

Now the students move ahead photographing the training simulator and for the purpose of my analysis an interesting question emerges: What kind of interaction occur with the use of photography as part of the learning activities? Are the objects becoming only visual subject matter for photography and does this form of interaction give room for reflections about the artefact's attribute? Is this an example of how the use of technology constrains? Anyhow, the tablet computer structures the student's actions. Why I put forward these questions is for the reason that they do not verbally reflect upon this artefact other than saying that it is a training simulator. So, to answer these questions: Yes, I do think that the interactions with the objects are changing in character when the students work with photography, and that the objects attributes in which case first come into question when Sophia and Anna starts writing the storyline.

> Sophia: I want to read this. Yes, it is. It is a training simulator. We should take a picture.

The observation video shows no evidence that she actually read the text label in the exhibition other than the headline. Without saying anything more about the training cockpit, they take a picture of it before they move ahead in the exhibit. Even though this is a subjective interpretation from my point of view it may open questions if the students would have reflected more about the artefacts attribute in a dialogic manner if interacted without a camera/tablet computer. If this is for the better or for the worse, lies beyond the focus of this study. They seem to move around in the exhibition looking for imagery, as if making sure they are collecting the right information and are not missing any visual interesting aspects. Working with tablet computers and photography in the museum exhibition as part of a museum visit structures interactions differently than museum programs, with no intention for the visitor to present the museum object trough photography. Ideas to illustrate the magnitude and size are put forward in dialog between the students, however they give the impression that the educators tip on close-ups images (this will be addressed in chapter seven) has a stronger

influence than their own ideas and hence they commence a session photographing the luggage trailer which is situated on the floor under the airplane, before doing more shoots of the training simulator. In addition they find archive images stored by the museum educators on the tablet computer.

In relation to the issues of available archive information the two students have not the distributed archive booklet with text and images with them when interacting with the exhibition, so at this stage they do not seem to require any information other than trough photography. In this way the tablet computer for them only has the function of a camera all though there are archive images stored in it. They are comparing the archive images with their own photos in an attempt to identify photographs that are already in the archive, and that they therefore do not need to photograph themselves.

> Anna: There are surely many of the same photos which we have taken already in the iPad. (..) if we look at the photos they already have, because there are no use to take photographs we already have.

In this way they interact with the archive images stored in the tablet computer and it seem that they "fill in the gaps", i.e. images that they think are missing in the archive. There are no indications that the students desire to brows the web to be found in the video material of these two students all though there is no internet access in the exhibition room. Way I point this out, is for the reason that the students in pilot test two require internet access immediately when arriving in the exhibition to find information. The question of internet availability will be discussed later.

There are no identifiable indications of a storyline and the structure behind the selection process during the interactions in the exhibition, and it seems that they just want to make sure that they do not spend time making imagery that are similar to those already present in the archive. I will argue that the students not seem to reflect on the fact that they can collect information for a story narrative with the camera. It appears as if they only think of photography as cool or not cool imagery related to a focus on collecting images. Or maybe they just have not reflected on what kind of information and stories that a photograph may contain and this can perhaps be related to the age group and youth practices. The documentary properties of photography are something that needs to be learned and understood trough instructions and experience.

At the end of their interactions in the exhibition, which ends up being their first and last in the exhibition this day, they conclude with:

> Sophia: I think we have enough images now. We can come back later anyhow. We have 23 photos..21 photos.

They conclude with 21 images being enough and utters that they can always come back up in the exhibition to do more photography. Therefore they move two floors down to the classroom to continue the process of producing their digital story. In first instance the number of images appears to influence when to end the interactions in the exhibition space, but this interpretation should not exclude a possibility for a more reflected decision. In total they spend eighteen minutes collecting and interacting in and with the exhibit.

This episode describes how working with Tablet computer with the intention of presenting a museum object through photography initiates interactions with and within the museum exhibition. Sophia and Anna interact and observe through the tablet computer and in dialog with each other. The free-choice aspect of their interactions enables them to in a personal manner choose and collect imagery complementing the archive. Furthermore, the process of photography develops new interactional aspects, and incorporates the role of the museum on how to communicate the museum archive. While walking around in the exhibition Sophia and Anna in collaboration conclude themselves how they want to portray the exhibition in interactions with the airplane and the accompanying objects (training simulator, luggage trolley and so on) and archive images. In addition, with photography they may document their museum experience, which again personalizes their meaning making process.

6.2.3 Episode 2 – Collecting and Selecting Information

Now that the interactions in the exhibition are over the students starts to collect information from the archive handout. The following sequence illustrates how they read facts and related stories from the archive and select what they personally think is and is not relevant to include in their story.

In this process of selection it becomes visible that the students prefer a focus on an entertaining aspect and the students incorporates their own experiences of travelling with

airplanes. At this stage it seems to be Sophia who is the most focused and have the idea of incorporating personal experiences taking the initiative to ask Anna what she remembers regarding her own experiences when traveling by airplane. These two students talk about fear and turbulence when flying. The students read from the archive text:

> Anna: First female pilot.
> Sophia: We want to add something personal too
> Sophia: Do we write down our own experiences on an airplane?
> Sophia: Key words what we think. What we associate with flying. What we remember the most from flying. I associate with air pressure in the ears. Turbulence. Write turbulence.

Further they write down what they personally associate with flying and different models of airplanes. In this way they reflect on their own knowledge and hence with their personal experiences, thus recontextualizing their museum experience into the larger context of their own life.

Discussions on what they think are fun and/or interesting illustrates their push to incorporate personal interests to make the story more exciting.

> Anna: It's no fun hearing about year of production as such. (..) what is fun is that it almost tipped over during the transportation to the museum.
> Sophia: Yes, write that.
> *Sophia: What do you associate with flying? (..) What about turbulence?*
> *Anna: Is that like when you are falling?*
> *Sophia: Yes. That's what I think is worst of all.*
> Sophia: Was there something that happened to you on the plane once, something that was really scary?

When the students read from the archive handout they alternate between facts and stories from archive and their own personal experiences and interests. There seems to be a process of selecting out the information in the archive which they do not think will be entertaining for the viewer and they include those that relate to their own personal experiences as part of interpretation and meaning making.

> Sophia: Is there anything we can say about pilots or something?
> Anna: We can say something about her, Turid.

At this point production is still happening trough the use of pen and paper and until this point the tablet computer has been used only as a camera and to look at archive images. Later they use the tablet computer to edit their finished digital story.

> Anna: I can't understand what you are writing. Now you are doing everything.
> Sophia: That is because I write what I think and then you write what you think.

Anna: If you write in this and I write in that (referring to their written text)? That's much quicker.
Sophia: Ok.
Anna: We just need to find where to divide it up.
Sophia: Ok. If you write the first part I'll write the second part.

The examples presented in this episode illustrate how the students in collaboration use the archive material and incorporate it to their personal experiences and interests when creating the story narrative. Hence, it also illustrates how cooperation is solved. These are chosen as good representative examples, however there are other examples which I also could have presented to be found in the data corpus. Sophia and Anna work and discuss the storyline for over an hour, however for the purpose of my analysis only a few examples of their dialog is chosen to be presented.

6.2.4 Episode 3 – Editing

This episode provide descriptions of dimensions related to the editing process when Sophia and Anna in collaboration flick trough images with the purpose of assembling the images in cohesion with their storyline.

This episode commence when the students after have been writing the storyline pick up the tablet computer to look at images. Sophia and Anna flick trough the images comparing their own imagery with the archive images, putting forward ideas on which images that are illustrative for their story.

Anna: It's a really bad camera.
Sophia: I know.
Anna: They have much better photos.
Sophia: Yes, I know.
Anna: (…) We'll use the photo of you, that's funny. (...) He said that close-up photo's may be cool, even though it is not important.
Sophia: That one we'll use
Anna: It is many bad photos.
Sophia: Yes. But it's very difficult.
Anna: (...) No point in using the text (there are images with archive text stored in the Tablet computer which they look at), no one bothers to read them anyway.

In this manner Sophia and Anna in collaboration assembles the narrative to their digital story. They move between discussing images, information in the archive handout and their written storyline which then is further worked on and improved.

Anna: The picture thing is not that important, we do that at the end because then it fits our story.
Sophia: Ok (…) I think we have some personal opinions too.

When it is their turn they record voiceover in a temporary set up sound studio in a room next to the classroom. Returning back to the classroom they listen to the recording and start editing the story in I-move on the Tablet computer.

Anna: There we speak (they are listening to the recording) about that lady (Turid). (…) It really irritates me that we haven't got a photo of that lady.
Sophia: Yes. We'll use that one. Even though it's not her, it's a pilot.
Anna: I think the wheels (photos of the airplane wheels) were funny, really.
Sophia: Ok, we'll use that then.
Anna: (…) I think we should have sound effects.
Anna: I really think we should have a picture of you and me.
Sophia: Wait. Do you know what we can do know? Look here..the one with..
Anna: The one with the shipment (images from the freight to the museum)?
Sophia: Yes. This one?

The tablet computer facilitates for collaboration when the students use the touch-screen to move images on the timeline in iMovie (figure 7) and at the same time playing the voiceover to make sure the images appear at the right moment.

Figure 7:

The final story is a mix between archive information (facts about the airplane) and personal experiences. In the voice over the students explain how turbulence is pockets under the clouds with no air, and also that pressure difference may create air pressure in the passenger's ears. Additionally they talk about how they associate flying with a little fear and boredom.

I have until now in this chapter moved trough thin and thick descriptions in pilot testing day one. What follows is a simulation of the same method with pilot testing day two. There will be a few comparisons between pilot testing day one and pilot testing day two in the next part, however comparison the two is not the main objective.

6.3 Thin Descriptions Pilot Test Day 2

Even though the context in pilot test two are similar (with a few exceptions) to pilot test one I see the relevance to provide thin descriptions also here. The pilot had undergone a few structurally changes and the two students which I observed in pilot test two made actions different from the students in pilot test one. This observation follows two eight grade students whom I have named Mark and Jacob.

After the first pilot testing the museum altered the order of things. The idea was to make sure that the students spend more time in the actual exhibition space. For this reason the program was added with new aspects and the museum educators initiated the day with a quick introductory to the exhibitions in question in contrary to pilot testing day one when the introductory part was initiated in the classroom. The intention was to lead the students in understanding how the museum objects represent historical and contemporary aspects of society, and therefore the importance to initiate this activity in interaction with the museum artefacts. After the introductory to the exhibitions the museum educators commence an information session in the classroom about the assignment, program for the day and the tablet computer with complimentary software.

Soon after Mark and Jacob have begun their interactions and photographing in the exhibition Mark enters the I-movie program on the tablet computer and starts to incorporate images and in a way they begin the editing process already at the collecting stage. Briefly described, the students read from the archive handout with text and images, they look at archive images and illustrations on the tablet computer, while at the same time they photograph in the exhibition, edit in iMovie and discusses ideas for a storyline. After some time they seek one of the museum educators to ask him questions and start walking the stairs down to the classroom. However, on the way down they change their minds and find a table in another exhibition room and sit down to make notes for a storyline. When the two boys have worked for a while

they move further down to the classroom. There they meet the museum educator and get answer to their questions.

Now that the students have been working on their story in the classroom for a while they move back up in the exhibition to photograph the wings of the airplane. Entering the exhibition one of the museum personnel guides them up and inside the airplane. In the exhibition space there is an amphitheatre and the boys sit there working the rest of the time available before recording voiceover in a sound studio which is located in the same space. Mark and Jacob had already before the voiceover edited the images, and so the digital story was finished when the recording was done. Now the viewing of all the group stories was initiated in the classroom.

6.3.1 The Students Final Digital Story Pilot Test Day 2

Mark and Jacob's digital story start with an archive image of the airplane and Jacob's voice present the Carravelle airplane with facts about wing length weight and so on. Next is a photo of band playing and Mark's voice mimicking a documentary about the airplane's first journey. This overlaps with an archive photo of the airplane in the air and with sound effect (sound of an airplane), and Mark's voice imitating an airline stewardess who present the menu of the day. During the presentation of the menu the imagery switches between their own photos from inside the airplane and the archive images of airline stewardesses. Now follow images of the transport of the airplane to the museum with Jacob's voice explaining how the airplane was transported and mounted in the museum. The End.

This was a thin description of the pilot test day two, and what follows are descriptions rich with details presented as episodes.

6.3.2 Episode 1- Meaning Making With Objects

This episode illustrates how the students use the exhibition objects to explore ideas for their story, and this way it also illustrates the properties of museum learning – learning with objects. It also shows how Mark's apparently technological skills enable them to begin the

editing process that early on in the process. Al though different students work and solves assignments in different ways.

After only a few minutes in the exhibition the Mark and Jacob want to go online to find information in addition to the hand-out (archive) however there is no internet access in the exhibition. The students want information about the airplane which they can not get in the archive and in this way the essence of the communication technology constrains when not utilized to its fully potential. On the other hand, this constrain may be used as feature to frame the activities which comply with a limited-choice program in the museum as presented in chapter two. Our subjects of observation start discussing and editing a story line from the beginning. They want to go online on internet, they browse the archive images on the tablet computer and read from archive hand-out with text and imagery simultaneously while walking around in the museum space interacting with the museum objects. Working this way Mark and Jacob are able through interactions, to test out their ideas in dialog and with the support of the software.

The two boys start with photographing the front of the airplane and the observation video again shows how the big screen on tablet computer gives both the students a good look at the viewfinder whoever is holding it. As I have discussed earlier the relatively big screen supports cooperation. In this episode the students do relatively a small amount of photography. Comparing students from pilot test two with pilot test from day one the observation video show that Mark and Jacob are not photographing a lot in the beginning of their explorations of the exhibition, and new interactional aspects occur when present under and around the museum artefact during their interactions with the archive images, archive written information and the software in addition to the technology and the process of photography. Consequently, their interactions trough the tablet computer is extended to incorporate interaction with the archive, interaction with the exhibition space in addition to the physical interaction with the artefact. Walking around and nearby the airplane when discussing and laborate ideas for a storyline results in an interaction with the archive and the airplane simultaneously. The students interact and collect information with the use of tablet computer as a tool. The tablet computer contains images both from the archive and the students own images, and in addition the authentic object (airplane) is available for exploration and interactions.

Further on Mark and Jacob discuss if they want to photograph the side of the airplane and the wing. In the rear end of the airplane students randomly meet one of the museum educator and

starts asking him questions. They want to know how long the wing is, details that he is not possessor of, nevertheless he informs them about an additional archive booklet which is available in the classroom. This information could have been stored on the tablet computer, and later the students found this related information on the tablet computer which I will explain in episode 2.

The way Mark finds archive images while working on the tablet computer shows some of the potentials that lay in the possibilities that introduction of handheld technologies bring to the museum learning experience.

> Mark: There the engine is. Maybe we can say something about how much fuel it contains and such. I think we can find that in the booklet.
>
> (..)
>
> Mark: Do I edit in music?
> Jacob: No, we need sound effects. It was perhaps a big thing in those days?
> Jacob: 50 years ago it was a big event to travel by airplane.

Further in Mark finds additional images on the tablet computer and an image from the transportation to the museum they find particularly interesting and also an images with text with information about airplane speed. Photography with the tablet computer gives opportunities for collaboration and a subjective interaction with the object, in a totally different manner than without. In this way the process of doing photography invites them to interact perhaps in a more attentive way than if just walking around looking without the intention of producing anything as in a visit to the museum with only free-choice. This is related to the question discussed earlier discussed (in 6.2.1.), of what kind of learning interactions occurs? Anyhow, the push for working with photography with a tablet computer as part of the production of a digital story helps framing their museum experience. In all the assignment as it is constructed facilitates for this kind of interactional activities. Again, the assignment solved with tablet computer as a tool frame the museum experience in compliance with a museum visit with limited choice.

Mark and Jacob are still occupied under and around the airplane, and now wants to enter the airplane to take photos but it is not available at this point. It seems that in the manner these two students work, their progression in producing the digital story is hindered when the inside of the airplane is not available for interactions immediately after their ideas are present. Does

this imply to limited choices? After all, it is learning from museum objects which are the main focus.

> Mark: We can tell a story about something happening today. That the airplane is ready for takeoff. Can we do it this way?

Mark directs the question to me and I replay that if they have questions they may ask the museum educators. Therefore the students move down a stairway and this sequence commence in episode 2.

So far the students have collected from archive images, papers handed out by the museum and by reflecting with the information obtained and once again the urge to browse and collect from internet. Consequently they are forced out of the exhibition space to go down to the classroom to get internet access. Not in line with youth practices i.e. they are used to be able to go online working with digital technology. However, as I have discussed earlier, this constrainable feature is one option to be used in framing the activities as a limited choice museum visit.

6.3.3 Episode 2 – Collecting Information

With this episode other than describing occurring interactional agentive actions, I wish to illustrate how the students are given possibilities for choice, and how I relate the students seeking the educators approval to their sense of agency. In addition I present examples of they broaden their understanding of the museum artefacts by "reading" archive images.

Our group in focus seeks the museum educator for answers about the assignment and on the way back to the classroom they decide to try for them self and find a table in the museum space, one floor down from the exhibition with the airplane. Jacob sits down and writes with pen and paper and Mark continue to work with the tablet computer standing up. This is a perfect example on how the museum visit facilitate for interaction with the museum space by giving the students physical possibilities for choice hence authoring their own experience. The Fast Forward pilot open up for new interactions. Students participating are given the authority and accountability to use the archive, the chosen object as media content however they want to use it. Where in the museum they sit and work and how and in which manner

they work is irrelevant. They decided that they needed notes and hence an urge to find something to support the paper and by that find what is available for such an activity and continue working. Early in this episode Mark finds an image (figure 8)

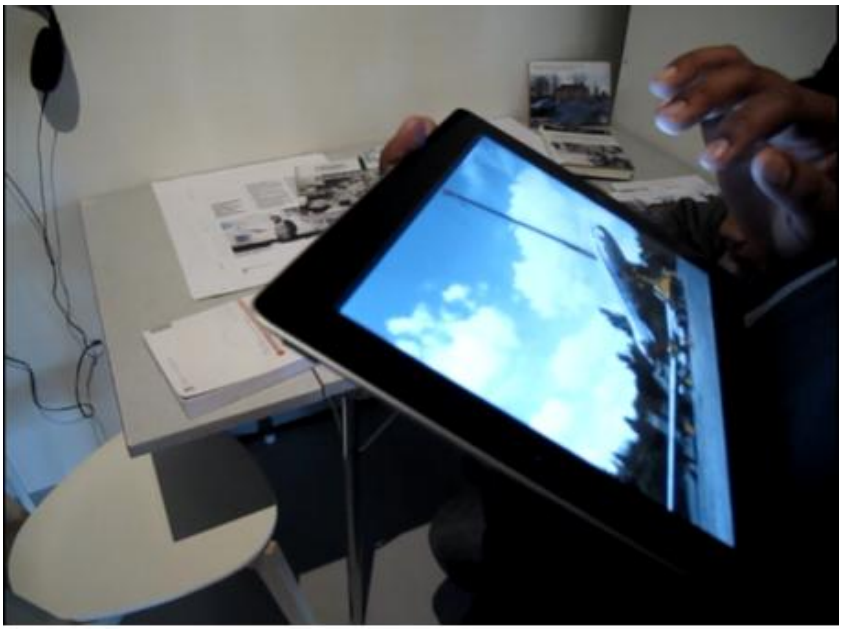

Figure 8:

and utters:

> Mark: It looks like as if it has crashed or something.

Jacob is writing down key words from the information Mark is finding while flicking trough the archive information with Tablet computer, and after a while Mark finds that he has found meaning in the image from the quote above.

> *Mark: Now I know what that image illustrates.*
> *Jacob: So, what then?*
> *Mark: It's a photograph from when they transported it to the museum.*

What happens in this sequence is that by interoperating archive images they collect information that broadens their understanding of the museum artefact. Hence, when the tablet computer facilitate for them to flick through the images, they have the opportunity to gain knowledge without reading text. The tablet computer technology also facilitate zooming in and zooming out images, and in this way "read" the images in a personal manner finding meaning in the archive photographs. This zooming in and zooming out is related to new literacy discussions briefly described in chapter 2.

Mark finds an image with text on the tablet computer with the information which the educator told them (in episode 1) that they could find in an information folder in the Robot Center. This archive information was stored in the Tablet computer after all.

> *Mark: It can fly as fast as 850 km per hour.*
> *Jacob: Good, then we have that information.*
> *Mark: The wing is 34,3 meters long, and the length of the plane 32 meters. So, the wing is longer than the wing. The weight is 46000 kg.*
> *Jacob: 46000?*
> *Mark: Yes. Or you can write 46 tons.*

I see the potential of the museum to put more weight on informing and motivating the students to read archive text on the Tablet computer, and this issue illustrates how this new technology is not yet fully integrated into the learning program in the pilot. A comparative feature between pilot testing day one and day two emerges. In pilot testing day 1.(episode 3, 6.2.3.) one can see in the dialog between Sophia and Anna, when they look at the images with text on the tablet computer, how they does not seem to reflect on that there is information in that text which maybe valuable. Comparing that to the above dialog between Mark and Jacob one can see the different interpretation of the archive images. Sophia and Anna see them as only images with text (but they do not read this text) and Mark and Jacob see them as valuable facts about the airplane. There seems to be more potential connected to the tablet computer as tool for both collecting information also by browsing images. On the other hand the examples also show how the tablet computer facilitates for meaning making in and a less authoritative way. I.e. less direction by the museum on how to experience the museum. By giving the visitor the archive both on paper and on the Tablet computer without explaining how they maybe used in different ways, is one way of maintaining the visitor choices.

What happens in the next dialog is that one student is writing notes and reading on the handout and the other collecting tablet computer information from the images with related text.

> *Mark: Write about luxury food and such.*
> *Jacob: According to the sheet they were dressing in nice clothes.*

There are images on the handout as well, but the technology I would argue simulates student activity in informal learning environment outside institutions as museums and schools. Eventually they go back and work in the classroom which is seen as part of the total museum space where they went to get internet access again interacting with the museum space

facilities. Also later in the visit they sit in the museum space working in an amphitheatre which is placed in the middle of the exhibition room.

On the way down to the Robot Centre they meet the museum educator and they ask him questions regarding their idea for a story.

> *Mark: We have a question: Can we make a story or something?*
> *Museum educator: You need to specify the question in more detail.*
> *Mark: For example that the airplane is ready for takeoff?*
> *Museum educator: Yes, you may choose for yourself, as long as the story contains something about an airplane. So, write about something you think would be cool to write about.*

They seek approval for their solution and the educator explains that the only prerequisite is that the story has something to do with airplane which is their chosen subject. The students seeking approval I connect to the arguments of students sense of agency, and also the fact that the educator instruct them to choose for them selves. I will discuss this in detail later when I analyze agency in chapter seven.

The boys have now arrived in the classroom to be able to get online and they immediately start browsing the web about the Caravelle airplane, and the museum educator comment on the students work online with external sources. They discuss the archive booklet and the students show the museum educator how they found information on one of the archive images which opens up for opportunities for collaboration with the student and the educator. The educator can gain knowledge on how the student/youth work and communicates with the technology. The museum educator acknowledges the students way of working and also inform them the archive is only meant as complementary information.

> *Museum educator:(..)This (the information booklet) is only intended as complementary information. This information maybe more than enough, you do not even have to consider it. Perhaps you use it perhaps you don't. (..)Your challenge is to find out how to use these facts to tell about something spectacular, anything that you think is cool to tell about. You can also use your imagination.*

This is in compliance with the idea of developing the students as agentive learners providing them with choice. Mark continues collecting information from the web and Jacob write notes with pen on paper. They work their story around their interpretation of the archive images.

Again I have attempted to illustrate how the students collect and chose the information as part of their narrative story by using different sources available. This episode I argue also is a great example of a limited-choice visit. The assignment to produce a digital story with tablet

computer with one chosen theme or object as subject matter provides the structure dimension. Where as the way the students are able to explore the exhibition in question and the museum space in total provides the free-choice dimension of a limited-choice visit. Furthermore I argue that the way students are seeking approval, illustrates how one can imagine how students as agentive learners are developing when giving authority and choice by the educator. However, I do not argue that the students I have observed necessarily do have developed as agentive learners. Such an argument would have required following the students over a longer period of time, doing post-tests and pre-tests. Anyhow, development in any form I see as an ongoing and lifelong phenomenon.

6.3.4 Episode 3 – Exhibition Revisited

After working in the classroom for a while Mark and Jacob want to go back up to the exhibit to do more photography.

> Jacob: Do we have a photo of the wings?
> Mark: (..) no we don't? Should we?
> Jacob: Yes. We then have to go up and do it. Shall we?
> Mark: Yes.

When arriving in the exhibition space they meet one of museum educator who brings them inside the aircraft. The students meet the museum educator by coincidence on the way up in the exhibition, and he asks them if they want to go inside the airplane. This appears to happen by chance so that facilitating for this interaction seems random at this stage. Inside they count how many seats there are and find that the light conditions are difficult to photograph the cockpit, however they photograph the seats and the wing trough the windows. Even though they got suggestions from the educator to photograph the training cockpit outside the airplane if they had difficulties with light conditions inside they decided not to when they went out. The cockpit in the exhibit is exactly the same as the one in the airplane. Next they walk around the airplane and they name the artefact out loud as they walk along. Turbine, the luggage carrier and so on. They end up sitting down in the amphitheatre working with the storyline.

When sitting in the amphitheatre working, Mark and Jacob discuss their own experiences with different airlines and food services after having found an archive illustration on the Tablet computer with a stewardess serving food, hence incorporating personal experiences.

> *Mark: Do we say that at the time they served luxury food and better than today?*
> *Jacob: Was it more luxury back then? I think the food is better today. As long as it is not from Ryan Air. There you have to pay for the food.*
> *Mark: I like the food on Qatar Air. They serve pizza and such.*
> *Jacob: Yes, that's true.*

In their final digital story they do not talk about the airlines mentioned, however in the voice over they imitate a flight attendant who present the menu on the speaker.

This episode shows how Mark and Jacob are able to use the features of meaning making with objects when they change between interactions with the museum exhibition, the museum archive and their own personal experiences with flights. Further I argue that the randomness of the incident when the two boys where able to enter the airplane is an issue. In pilot testing day one Anna and Sophia did not get the opportunity to enter the airplane even tough their fellow students did. This illustrates the importance to structure more specific towards the free-choice dimension of a limited choice museum visit. If the museum want to frame the visit in a limited choice visit, they must make sure that they structure specific and well planned.

7 Agency Discussions

The previous chapter illustrated the context which the students interacted in as well as the interactions that occurred with tablet computer and the production of digital stories in the museum. This chapter however, demonstrates examples of how this educational program might facilitate for developing student agency and also how it supports the student as an agentive learner. These issues will be presented as *events* from both observation day 1 and observation day 2, and not necessarily in a sequentially order.

7.1.1 Agency and Photography

In this paragraph I move deeper into a discussion on agency and photography. When the museum facilitates and structures the students action within the framework of photography with tablet computer technology the actions that occurred in this pilot mimic the idea of an agentic learning activity. The four themes the students can choose to produce digital stories about and the use of tablet computer technologies maintain the limitations and the photography process is one of several dimensions which maintain choice in this program.

As presented in Episode 1 pilot testing day one, immediate after arrival in the exhibition room Sophia and Anna position the Tablet computer so that the airplane is visible on the screen and find that the size of it complicates the photography. At this stage the pupil's actions coincides with the museum educators guidelines which is first to do photography and then write and create the storyline. Although they do not seem to question the order of things this leads to an interaction with the artefacts that resembles negotiation. I relate negotiation with agentive learner. There are free-choice dimension in the photography process, and the students can photograph in what way and in which manner they require, hence I argue that the students negotiate with the archive imagery when they chose their own imagery of presentation. I will here present this as photographic agency or imagery agency, and argue that it coincides with epistemic agency. However, to what extend they in fact disconnect from or negotiate the ideas and guiding from the educator is a question which this analysis seeks to answer. In Regards to agency, the task of doing photography facilitates for the concept of epistemic agency (Erstad & Silseth, 2008) when they get the opportunity to create their own personal imagery to communicate their view on the subject in their digital story. The process of photography in

Fast Forward invites the students to investigate the object's size and aesthetics in a subjective manner rather than being led to an objective understanding, and it is in this relation that earlier experiences with agentic actions is crucial to the students effort to pursue their personal interests and motives. There is not necessarily any use in giving the students choice and authority if they are not used to handle it. For this reason I argue that seeking approval may illustrate this issue. In addition and in the same relation I argue that the development of agentive learners must bring into consideration that humans by anticipating the future with past experiences perform their actions in the present moment (Emirbayer & Mische, 1998). Furthermore, to analyze a pedagogical environment with the intention to identify if it develops agentive learners it must be linked to development in a larger context. If the participants in such a pedagogical environment have limited experience with agentive learning practices, they must likely show limited agentic actions. Included in such an argument is the idea that the participants not only are given agency in the learning activity but also brings with them agency (past experiences). Therefore, supported with the arguments above, limited agentic actions do not necessarily originate from the particular pedagogical structure they interact with. However, that may be the case too.

I will now go back to the event when Sophia and Anna are given instructions on photography. While walking under the airplane one of the museum educators gathers the students and trough a monolog offers instructions on photography, and as argued earlier this session implies new roles for the museum educator and the visitors. The students are given the authority and accountability to conclude themselves in what way to present the museum artefact through photography. Giving the students this authority and accountability is connected to the development of the agentive learner. The students contribute and incorporate the role of the museum to find ways to communicate the museum archive. However, the educator's advice to do close up photography seems to have a huge effect up on these two students when they choose their perspective of photography.

> Museum educator: Anyone who has attended photography courses? Do not be afraid to get too close to see the details. It can be cool with details. Get close to the details and do landscape.

Here one can question if the advice from the educator was too leading and/or if the student's sense of agency was not that great in within this aspect. In several instances the students refers to the educator's advice to get close to photograph details.

> Anna: He said we should capture details or something like that. Close up images of something important.

Now the phrase: “It can be cool with details.” Has turned into: “ Close up of something important.” And later:

> Sophia: Although we shall do that kind of close up photography it is good to get an understanding of how big it is.

Even though the educator’s advice do have a leading effect upon their choices Sophia in the end does show a sense of agency in when she sees the importance for her to show the size of the airplane despite their earlier interpretation of the advice given. Ideas to illustrate the magnitude and size of the airplane are put forward but they give the impression that the educators tip on close-ups images has a stronger influence than their own ideas and hence they commence a session photographing the luggage trailer which is situated on the floor under the airplane before doing more shoots of the training simulator.

This paragraph shows how the process of photography and the educator empowers the students with accountability and choice in their museum experience. Furthermore it illustrates how the girls show capabilities of negotiation when uttering that they want to illustrate the size of the airplane trough photography, even though they during the process had interpreted the educators suggestions on photography differently.

7.1.2 Agency and Structure

In this section I provide an example and arguments regarding how structural and architectural aspects such as exhibition design and lack of relevant instructions may restrict visitor choice. This show the importance of acknowledgements by the museum educators concerning the ever existing tension between agent and structure, consequently the need for the educators to be aware of how structural and instructional features shape visitor actions.

The airplane is facilitated with the original stairway to walk up and move around inside. Several times during the interaction session our two students in focus discusses this challenge when they have a desire to photograph the inside of the airplane.

Anna: I think that we should catch the inside as M. did.
Sophia: Inside? (..) But there is a barrier in front of it.

Sophia and Anna walk away and start photographing the body of the plane and then again the urge to photograph the inside.

Sophia: What else do you want to photograph?
Anna: Inside
Sophia: Inside? But there is a kind of a barrier.
Anna: I can do it if you don't dare to do it.
Sophia: Yes, I don't take the chance. It is such a barrier.
Anna: Do I dare to? Oh..it was very dark in here. It was difficult. (..) It is the scariest stairs I have ever been on. Scary.

The barrier is not on the actual stairway, the obstacle is the airplane door which is replaced with transparent Plexiglas where one can see into the airplane (figure 9).

Figure 9:

One can argue that in this temporally context and situation previous experience with agentic action is absent. However, one may also argue that they show respect for the museum artefact who they know is authentic and relatively old. Therefore, I argue that the museum advantageously could specify what the visitor may or may not do when interacting with the objects. When for instance visiting a National Gallery one is strictly prohibited to touch anything, so the students are likely to think that they may not step on the airplane stairway

because of previous museum experiences. In relation to the structural dimensions of agency I argue that the museum in favour could have been more precise in their instructions regarding to what extend the student physically could interact with the museum objects. After a while Anna did find courage to walk the stairs to find the light conditions too challenging to get good quality images inside the airplane. Anna in action utters an unsettling feeling standing on the old wiggly airplane stairway.

This paragraph is an example of the how a museum exhibition may constrain the students and further how the student show little understanding or sense of their choices by seeking approval. Limited sense of agency as earlier argued, may originate from instructions given by the educators and/or from limited experiences with agentive learning practices. But in a museum context may the physical architecture such as exhibition design pose additional barriers and obstacles. Sophia and Anna have several times during their interactions in the exhibition utter an urge to walk up the airplane stairway to photograph the inside without finding any good solution on how to make that action possible. Another important aspect is the fact that the museum educators usually guide visitors inside the airplane and also this day. Why the two girls in question was not part of the student group who went inside the airplane the empirical data do not give an answer to.

7.1.3 Moving Beyond Instructions

The assignment was presented as actions happening in a chronological order were they begin with doing photography and then writing the story with pen and paper, recording voiceover and editing their final story. This subsection illustrates how Mark and Jacob negotiate and move beyond instructions and this way show a sense of agency.

Mark shows great material agency (technical skills) when he immediately starts to edit the images in iMovie and the students also at the same time work with their ideas for a storyline.

> Mark: We can take a shot of the airplane.
> Jacob: Mover further back. (..) Hold your breath.
> Mark: How many minutes should we have?
> Jacob: I'm not sure.
> Mark: You can chose for your self. So we need perhaps five images with fifteen seconds? (..) Will sett it one point five (Mark working in iMovie). Maybe we can say that it is very big and such, at the beginning?
> Jacob: How old it is. When it was build.

Mark: What does it say in the text?
Jacob: What text? (Mark is pointing at the handout Jacob is holding in his hand) This is aviation history…last flight to Fornebu today (Reading from the text).
Mark: We can find information on the web also. It is internet here, or at least downstairs.

These two students practice authority in their process initiating actions that moves beyond what the instructions from the educators suggest. Their technical skills also facilitate them for these actions.

The event Moving Beyond Instructions is an example of how Mark and Jacob make use of the free-choice aspect in the museum. They have the possibilities to make meaning of the museum visit by interactions subsequent their personal interest and motivations, showing dimension as in the idea of an agentive learner.

7.1.4 Everything is Yes

In this paragraph I discuss issues related to how the museum educators support the agentive learner and how students seeking approval may originate in students showing less sense of agency in the context of Fast Forward.

After lunch pilot test two the second part of the museum visit is initiated in the classroom with information about sound recording and the museum educator answers frequently asked questions by the students before lunch.

Museum educator: You have asked questions relating to writing the story: May we use free imagination?
Student x: No
Museum educator: Yes. May we write something that contains only facts from the museum?
Student x: No
Museum educator: Yes. May we use something which we personally have experienced and which we think is cool?
Student x:No.
Museum educator: Yes.
Student x: Everything is yes.

The educator asks these questions rhetorically and he answers all of them with: yes. However, during all of the questions random students utters answers too. Summing up, mainly all the proposals to the questions by the students were: NO.

This example shows how the museum educator supports the students as agentive learners. Everything is Yes as an example, is an attempt to illustrate the museum facilitating student choice. The students have extensive with choice and the museum educator making sure that the students get the sense of the freedom of choice they in fact have. This example also shows how the students have required approval by asking these questions. And again I relate seeking approval to students sense of choice and sense of agency. To foster student agency requires that teachers and museum educators practise instruction which clarifies for the students their possibilities for choice.

In chapter six I have presented the context of Fast Forward and interactional aspects which occurred during the pilot tests. Furthermore in chapter seven I have presented examples and arguments regarding development of agentive learners and how Fast Forward structured students actions during the museum visit. In the next chapter I will discuss my findings and relate this to concept of agency and theories of museum learning as presented in chapter two and three.

8 Discussions and Concluding Arguments

The intention with this chapter is to organize and coordinate main findings and discussions from the analysis in chapter six and seven. Further I wish to relate these findings and discussions with related theory from museum learning and theories on agency as presented in chapter two and three. In addition I intend to present arguments regarding if and how my research methods and theories used for empirical analysis has provided me with fruitful and prosperous findings and conclusions.

By conducting interaction analysis with the use of observation videos has provided me with an extensive insight into the interactional dimensions which occurred in the Fast Forward pilot. From theories of agency, which has been related to a numerous of different terms (Emirbayer & Mische, 1998), I have in my analysis associated agency with freedom of choice, authority and accountability, and these dimensions relate both to structural and agentic aspects. This means that one can act in compliance with choice, authority and accountability, and that the environmental structure must provide the students (in the case of Fast Forward) with choices to act authoritatively and accountably. The students sense of agency (sense of choice) I have also added to my analytic frame, and which I have related to the students seeking approval for their ideas and their actions. The concept of agency and theories of museum learning has also provided me with tools to understand and analyze the relationship and tension between structure and students in learning activities in a museum.

8.1 New Visitor and Educator Roles

Regarding the interactions occurring in the Fast Forward pilot, I have found several interesting aspects. When the museum presents photography as an activity during a visit to the museum they at the same time change the condition of being a visitor which again implies new roles for the museum educators. Traditionally the museum, as in the Fast Forward, provides archive information containing both text and historical images. In the Fast Forward pilot the students incorporate the role of being a visitor and the traditional role of the museum. They combined their personal stories and their self-produced imagery with the archive stories

and imagery and presented a remixed story, and so were given the authority to communicate the museum content. The observation videos from pilot test day one provide examples where the students in dialog discuss and compare their own photographs with the photographs from the archive, and this way complement the archive with their own material. It is important that learning in the museum incorporates linkages outside the museum walls. The museum objects are pieces in the larger historical and societal context. When the students are facilitated with the opportunities to make this linkage subjectively, I argue the greater chance that they achieve these acknowledgements. Visitors to the museum have different historical and cultural backgrounds. Consequently, if the museum alone were to objectively "hand out" linkages to the visitors own experiences, the greater chance that the visitor does not have these experiences and can not make meaning of how this relates to their own life. In chapter two I presented the Contextual Model of Learning and the concept of Free Choice learning (Falk & Dierking, 2000). The Contextual Model of Learning present learning has a holistic process, which also concedes with socio cultural perspectives on learning (Säljö, 2001). Research has shown that the personal context (as described in chapter two) proves to be more influential on learning than the physical context, and that technology must facilitate which potentially personalize the museum visit (Falk & Dierking, 2008). Both in pilot test day one and test two the students discuss and incorporate their own personal experiences when travelling with airlines, hence possibilities to either consciously and unconsciously relate the museum content within the frame of their own lives.

8.2 Tablet Computer Interactions

One important interesting interactional phenomenon I found was that the tablet computer facilitates and scaffolds collaboration. The relatively big tablet computer screen seems to be a successful actor in collaboration activities such as photography and the digital storytelling editing process. I saw in the video recordings from both pilot test day one and day two how, when the students positioned themselves behind the ones who was photographing with the tablet computer, were able to watch the other students actions on the big screen. This way discussion regarding photography was initiated. The tablet computer's touch-screen and speaker features a great example of how this technology provides good possibilities for collaboration. I have illustrated with an image in chapter six (in 6.2.4.) how two students on

the touch-screen can flick and move images on the timeline by using the editing software while at the same time listen to their recorded voiceover. The tablet computer facilitate for a numerous different interactions. The empirical data shows how the students with the use of tablet computer in collaboration interact with the archive material and they interact with the museum artifacts trough photography. Furthermore, the portable proprieties of the tablet computer adds free-choice possibilities for the students when they are able to move freely in the museum space both interacting with the exhibition, read archive information and edit their story simultaneously. However I have raised question regarding what kind of interactions which occurs when introducing photography as part of the learning activities in the museum.

8.3 Agentive Arguments

What I have presented in this chapter until now I also link to discussion on agency and the agentive learner. The theories of agency which I have used to frame my analysis has given me acknowledgements on how one can look after clues in data material regarding linkages between agent and structure. In addition literature from the field of museum learning has provided me with a great starting point in acknowledgement the distinctive properties related to learning in the museum which I argue also would be relevant for formal learning environments. Research on choice in museum visits (Bamberger & Tal, 2007) has shown that the learning outcome after learning activities in a museum are better maintained in limited choice programs than in no-choice or free-choice programs. The Fast Forward pilot I argue is positioned within the frame of a limited-choice museum visit. My analysis illustrates how the museum educators by instructions provide the student with choice and sense of choice, I and therefore I see this program as means for developing the agentive learner. However, my findings also indicate obstacles and boundaries with origin in the exhibit, and further how the students often seek approval for their ideas and their actions. This I relate to the development of the agentive learner. Providing students with agentive learning experiences on multiple occasions I argue will eventually foster the students as agentive learners. In chapter three I presented arguments from sociology (Emirbayer & Mische, 1998) regarding human agentive actions where people act in the moment by anticipating future outcomes through past experiences (history). It is with this statements I follow arguments that agency can develop

(Kumpulainen, 2009), when the students in the Fast Forward are given agentive learning experiences.

8.4 Concluding Arguments

In compliance with societal developments, digital technology and digital media is the field of museum learning motivated to research the possibilities and constrains of the implementation of digital media in learning practices in the museum. I follow the ideas on museum learning as free-choice learning and with the idea of framing the learning activities in limited choice programs in the museum. I want to position myself as neutral in evaluating the quality of learning outcomes in the Fast Forward pilot. This is my first time researching and immersing myself in the field of museum learning, consequently for me to position the Fast Forward pilot as a program which preserves all the potential in museum learning I argue would be naïve. However, I do argue that the pilot imitates the idea of a limited choice learning environment, and further that it is a program which foster the agentive learner. The Fast Forward pilot I argue provide the students with choice and agentive learning experiences, as argued in the analysis and arguments presented in this thesis. Following these arguments, there are relevant for any educator to be aware of how the presentation of new technology also presents new interactional actions. In addition, I argue that the collaboration facilities which this pilot provides the students with enhance learning and so follow socio cultural perspectives on learning and meaning making.

If to discuss further research related to museum learning and learning with digital media and digital storytelling, I would focus on photography in particular and additionally use interview as method. By conducting interview as method possibilities for understanding the students own view and experiences in the pilot would have appeared. Mobile technologies provides each one of us with a digital camera and so to understand the consequences for learning and meaning making with photography I see as a constructive future. I will argue that students producing digital stories will be introduced to the notion of narratives as a mediator to understand the complexity of representing history based on museum narratives and objects. They will most likely either consciously or unconsciously obtain an understanding of how an artefact's history may have multiple possible stories connected to it. I relate this in connection

to critical thinking and statements that this move in decreasing the museum authoritarian voice imply a shift towards a more liberal political tradition hence a more democratic museum (Hein, 2012). After all, pursuing democratic stances in all aspects of society are preferable.

The Fast Forward pilot is for me a great example of how one can present photography within personal and the larger context of life if and the potential and making reflections on photography as a narrative tool. This could be integrated as learning activity before the pilot. This is an activity that possibly would have prepared students reflections, which the school could have utilized before the visit to the museum. As such the museum I argue is a great place for learning about cultural artifacts and history, to learn about photography and expanding multiliteracies (digital storytelling) simultaneously. And hence moving towards a more democratic education and life-long learning for the students by involving young peoples cultures of expressions and capability to connect knowledge gathered in the museum to their everyday and personal lives. In addition the students accountability could have been extended if the intention was to show their digital stories as part of the museum exhibition, and such would have been accountable to a wider audience (Rajala, Hilppö, Lipponen, & Kumpulainen, 2013) beyond that of the museum educators, teachers and fellow students.

I see my research as an important (if only a small one) contribution to the understanding of empowerments and constrains and structural aspects when initiating museum programs which seek the understanding of learning with digital media. This study of only four students and two pilot studies do not necessarily have importance beyond this particular context. However, I argue that the pedagogical programs framed in the idea of limited choice have great potential in any learning environments. I also argue that when initiating digital media and digital storytelling with tablet computer, one can advantageously make use of the experiences made in the Fast Forward pilot.

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